

*Great Lakes, Great Times, Great Outdoors*

[www.michigan.gov/dnr](http://www.michigan.gov/dnr)



# CONSERVATION AREA MANAGEMENT GUIDELINES

Michigan Department of Natural Resources  
Forest, Mineral & Fire Management

### **MICHIGAN DEPARTMENT OF NATURAL RESOURCES (DNR) MISSION STATEMENT**

"The Michigan Department of Natural Resources is committed to the conservation, protection, management, use and enjoyment of the State's natural resources for current and future generations."

### **NATURAL RESOURCES COMMISSION (NRC) STATEMENT**

The Natural Resources Commission, as the governing body for the Michigan Department of Natural Resources, provides a strategic framework for the DNR to effectively manage your resources. The NRC holds monthly, public meetings throughout Michigan, working closely with its constituencies in establishing and improving natural resources management policy.

### **MICHIGAN DEPARTMENT OF NATURAL RESOURCES NON DISCRIMINATION STATEMENT**

The Michigan Department of Natural Resources (MDNR) provides equal opportunities for employment and access to Michigan's natural resources. Both State and Federal laws prohibit discrimination on the basis of race, color, national origin, religion, disability, age, sex, height, weight or marital status under the Civil Rights Acts of 1964 as amended (MI PA 453 and MI PA 220, Title V of the Rehabilitation Act of 1973 as amended, and the Americans with Disabilities Act). If you believe that you have been discriminated against in any program, activity, or facility, or if you desire additional information, please write:

HUMAN RESOURCES  
MICHIGAN DEPARTMENT OF NATURAL RESOURCES  
PO BOX 30028  
LANSING MI 48909-7528

**Or** ® MICHIGAN DEPARTMENT OF CIVIL RIGHTS  
CADILLAC PLACE  
3054 W. GRAND BLVD., SUITE 3-600  
DETROIT MI 48202

**Or** ® OFFICE FOR DIVERSITY AND CIVIL RIGHTS  
US FISH AND WILDLIFE SERVICE  
4040 NORTH FAIRFAX DRIVE  
ARLINGTON VA 22203

For information or assistance on this publication, contact the MICHIGAN DEPARTMENT OF NATURAL RESOURCES, FOREST, MINERAL & FIRE MANAGEMENT, PO BOX 30452, LANSING MI 48909-7952.

This information is available in alternative formats.

Printed By Authority of: **The Michigan Department of Natural Resources**

Total Number Of Copies Printed

Total Cost: \$

Cost Per Copy: \$

## TABLE OF CONTENTS

1. Purpose .....	1
2. Definitions .....	1
3. Overview and Planning .....	3
4. Ecological Reference, High Conservation Value, and Special Conservation Areas .....	4
5. General Management Guidance .....	5
6. Managing and Protecting Threatened, Endangered, and Special Concern Species .....	6
7. Managing Biodiversity at the Compartment and Stand Level .....	9

## **APPENDICES**

Appendix A - DNR Biodiversity Conservation Planning Process, April 2005 .....	14
Sub-Appendix A – Public Advisory Team (PAT) Recommendations and Comments on Old Growth/Biodiversity Stewardship (OG/BS) Report .....	21
Sub-Appendix A (1) - Additional Information and Background Material On Landtype Associations .....	27
Sub-Appendix A (2) - Relevance of Climate Change to the OG/BS Design Process.....	28
Sub-Appendix A (3) – Compiled Comments on OGBS Report.....	29
Glossary to Sub-Appendix A .....	35
Bibliography to Sub-Appendix A .....	38
Sub-Appendix B – Biodiversity Conservation Planning Process Flowchart .....	39
Sub-Appendix C – Biodiversity Stewardship Internal Working Group Property Selection Steps.....	40
Appendix B - Conservation Area Coding .....	44
Appendix C – Natural Communities Management (in progress, not attached) .....	47
Appendix D – Natural Areas .....	48
Appendix E – Biodiversity Site Management .....	51
Appendix F – FCIT Biodiversity Assessment Plan .....	52

**1. PURPOSE.** The purpose of this document is to provide guidance to implement the Michigan Department of Natural Resources (DNR) Forest Certification Biodiversity Work Instruction.

## **2. DEFINITIONS**

**Biodiversity Conservation Planning Process:** a DNR process to establish a network of functional representative Michigan ecosystems on a portion of DNR administered lands. Through the process, conservation objectives, targets and values, as well as biophysical, social and economic influences and considerations, will be identified, assessed, managed and monitored. (See Appendix A DNR Biodiversity Conservation Planning Process, April 2005).

**Biological Diversity:** means the full range of variety and variability within and among living organisms and the natural associations in which they occur. Biological diversity includes ecosystem diversity, species diversity, and genetic diversity. Part 355, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

**Special Conservation Areas (SCAs):** areas of state forest land that have had one or more conservation objectives, interests, or elements identified. Conservation objectives listed in the SCA category have been identified through a variety of methods and mechanisms, and it is important to understand how the objective was determined. The type and strength of recognition—and possible management options—will vary depending on the process used to identify the conservation value. For example, some objectives are detailed in the Land Use Orders of the Director (force of law) while other may be identified through cooperative agreements (administrative direction). There are also objectives developed through Department process or agreement, i.e., deer yards, potential old growth (POG), and riparian buffers. The SCA category may also be used to document areas identified by an external group or organization, such as National Audubon Society's *Important Bird Areas Program*.

The SCA definition is purposefully broad to encompass a spectrum of conservation interests and elements. It is a descriptor that provides the land manager and/or stand examiner with natural resource information to make informed management decisions.

**It is the responsibility of the land manager, management staff and/or OI/IFMAP stand examiner to understand the intent of the SCA identification, as well as the implications for management activities. All SCAs should be coded as Stand Condition 8 in Operations Inventory. This will provide a single location to document conservation elements in the inventory.**

**High Conservation Value Areas (HCVAs):** areas that have been recognized for their contribution to specific conservation values, objectives and ecological attributes or significant social values (including ERAs on State land). Examples of a recognized DNR process<sup>1</sup> include legislation, administrative rule, Director's and Natural Resource Commission Orders. Examples of existing HCVAs include Dedicated Natural, Wilderness or Wild Areas, Natural Rivers, species recovery plans such as Kirtland's Warbler Management Areas, and critical dune areas. Typically, HCVAs are a subset of SCAs on State forest land that have had significant public participation and/or public review as part of the process. New HCVA areas will be designated using the approved Biodiversity Conservation planning process.

**Ecological Reference Areas (ERAs):** serve as models of ecological reference within the State and may be located on any forest land. The ERAs are high quality examples of functioning ecosystems that are primarily influenced by natural ecological processes. The ERAs are excellent or good natural communities: Element Occurrence (EO) Rank A or B) with Global (G) or State (S) Ranks of endangered (1), threatened (2) or rare

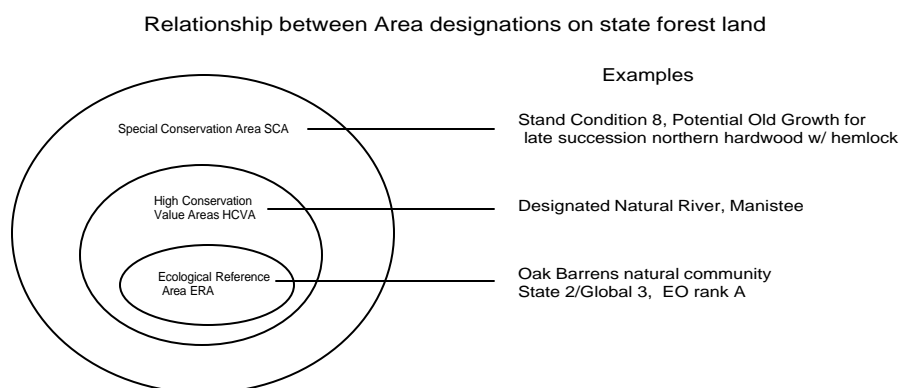
---

<sup>1</sup> Although an important public process, Open House/Compartment Review will not be a final approval forum for designating HCVAs and ERAs. It will be a key process for identifying potential conservation areas. The Biodiversity Conservation Planning process—which has a broader platform--will be used to review potential conservation areas.

(3).<sup>2</sup> The initial set of ERAs is based on Michigan Natural Features Inventory's current database of known high quality natural community sites. Additional ERAs will be identified through the Biodiversity Conservation planning process. All ERAs on state forest land are, by definition, High Conservation Value Areas.

**Illustration: ERA, HVCA and SCA designations are nested.** Three categories have been developed to quickly organize areas that have a conservation objective or value identified; Ecological Reference Areas, High Conservation Value Areas and Special Conservation Areas.

**Figure 1.**



### **Selected Definitions Of Programs Or Designations Used In Michigan:**

**Michigan Natural Community:** Michigan Natural Features Inventory has compiled a list of 74 natural communities that have been currently or historically were recorded in Michigan. Michigan's Natural Communities: Draft List and Descriptions provides information regarding physiography, geology, soils, and both dominant and characteristic plants that define the community.

**Michigan Natural Area, Wild Area, Wilderness Area:** definitions and process for designation are detailed in Wilderness and Natural Areas, Part 351, P.A. 451 1994, as amended. There are multiple designations and protections for Michigan Natural, Wild and Wilderness Areas. (See Appendix D for details.)

**U.S. Federal Wilderness Area:** federally owned and managed lands designated under the Wilderness Act of 1964.

**Michigan Natural River:** definitions and process for designation are detailed in Natural Rivers, Part 305, P.A. 451 1994, as amended. Each designated Natural River has an approved management plan and promulgated administrative rules that apply to the river and adjacent land.

**U.S. Federal Wild and Scenic River:** federally owned and managed river and adjacent land designated under the Wild and Scenic Rivers Act of 1968, as amended.

**Potential Old Growth (POG):** an area identified as potential old growth through the Compartment Review Process and entered into the Operations Inventory database as Stand Condition 8 prior to the Year of Entry 2008.

<sup>2</sup> Natural Community Rank and Element Occurrence in Michigan are determined by Michigan Natural Features Inventory using internationally recognized heritage methodology developed by The Nature Conservancy and used by NatureServe.

Note: POG is managed for the identified objective until it is: 1) vetted through the Biodiversity Conservation Planning Process and given a specific designation and objective (as a HCVA, ERA or SCA) or is released from the POG designation, or 2) it is released from the POG designation via the Compartment Review process with Field Coordinator approval.

### **3. OVERVIEW AND PLANNING**

The DNR is responsible for the stewardship of Michigan's natural resources and for the provision of outdoor recreational opportunities. Management of the State Forest system for a broad range of benefits and values is an important public trust responsibility. A healthy growing forest:

- Sustains fundamental ecological processes and functions that, in turn, support representative, diverse, and productive biological assemblages.
- Provides for a variety of ecosystem services that help sustain human civilization.
- Provides for a variety of sustainable, human values related to ecosystems and the services they provide; including economic, recreational, and intrinsic values.

Biological diversity is a key element to healthy, sustainable forests. Biodiversity exists at many levels of biological organization (i.e. genetic, species, communities, ecosystems and landscapes). Biodiversity also occurs at a variety of spatial scales from a few square feet to millions of acres. Natural systems are dynamic with natural processes and cycles affecting ecosystems, species and individuals. As these processes occur and as humans interact in natural systems, the balance between biological elements changes over time and space.

There are many ways to assess biological diversity; spatially (statewide, eco-region, compartment and stand); by species; and by ecological community (Natural Communities, Kotar habitat classification, Land Type Associations). The methods and systems used will depend on the intent and scope of the assessment.

The recently approved Biodiversity Planning Process is a methodology adopted by the DNR to review and assess biodiversity and conservation objectives. The process is tiered to provide statewide, regional and local conservation examination, public involvement and a broad range of biological, social and economic input. This process works within the DNR planning framework. The biodiversity conservation process is based on the filtering concept in which the process moves from coarse filters (e.g. Michigan Natural Features Inventory natural community types throughout Michigan) to using fine filters (selecting sites from several to hundreds of acres based on knowledge of local ecology and specific knowledge of species location and habitat).

The process can inform State, regional and local planners, managers, and staff of relevant biological, and social, and economic objectives and/or elements that have influence and/or importance in the geographic area they are assessing or managing.

#### **Biodiversity Assessments:**

A variety of assessments based on several information sources will be used. Examples include:

1. Operations Inventory/IFMAP information and data
2. Statewide and regional biodiversity assessments
3. GIS gap type analyses for representative native ecosystems, natural communities and species;
4. DNR Wildlife Conservation Strategy
5. DNR management Plans
6. Ongoing Michigan Natural Features Inventories
7. Stakeholder input
8. DNR central and field staff expertise, and
9. Local/traditional knowledge (Refer to WAG 9 Tribal Issues Work Instruction).

The statewide and ecoregional teams (see Appendix A, Biodiversity Conservation Planning Process) will be developing State and regional landscape assessments. These will be revised annually. Examples include coarse filter, fine filter and matrix forming landscape assessments (See Appendix F), as well as information on Ecological Reference Areas (ERAs), High Conservation Value Areas (HCVAs) and Special Conservation Areas (SCAs). The OI/IFMAP inventory information will be used in these analyses. The analyses, in turn, will be used to make management decisions in the OI/IFMAP process.

#### **4. ECOLOGICAL REFERENCE, HIGH CONSERVATION VALUE, AND SPECIAL CONSERVATION AREAS**

The DNR has used many mechanisms to identify areas of special interest that may have biological/ecological, social or economic conservation objectives or values. In some cases, the conservation objective is precise, e.g. Kirtland's Warbler habitat; While in other situations, the intent is less obvious, for example the use of Stand Condition 8 (Operations Inventory coding, Potential Old Growth). In addition, the documentation for conservation objectives is not necessarily found in one location. A goal of this guidance document is to assist in consolidating information related to biodiversity and ecological and conservation areas in one inventory database (OI/IFMAP). This will enable land managers, staff, and stand examiner to easily access information relevant to management recommendations and activities.

##### **a. Determining if an Area Fits a Conservation Category**

Determine if an area meets the definition of a Special Conservation Area. Refer to the definition and review the list in Appendix B.

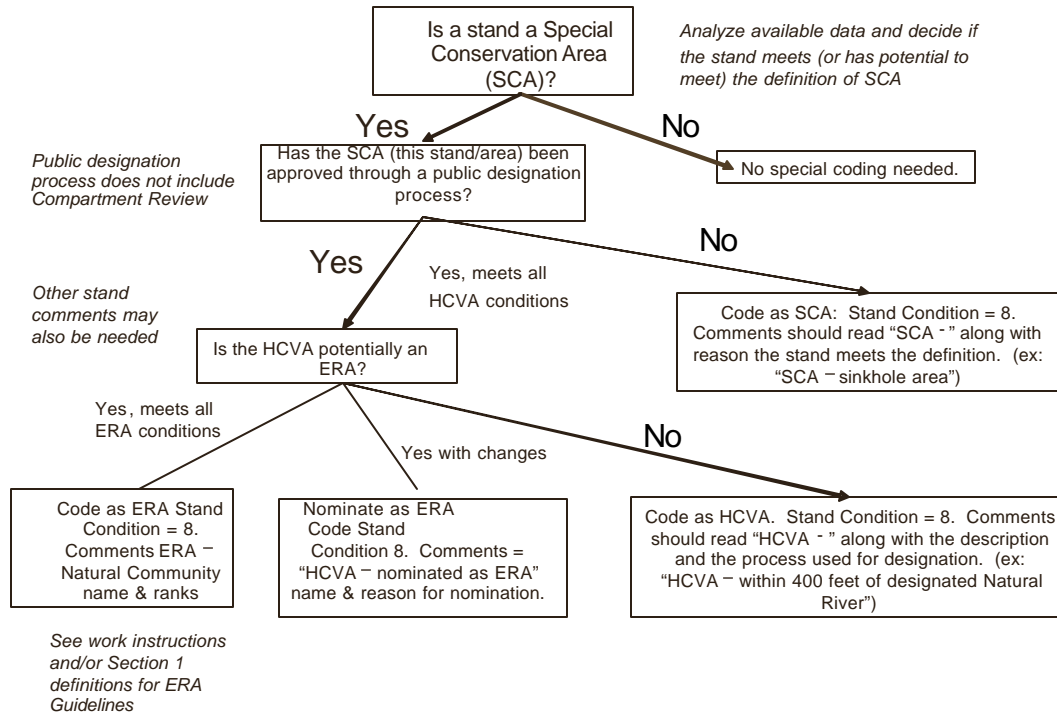
- i. Are there unique species, species associations and communities, intact natural system (composition, structure and condition), biological legacies, historic continuity or other?
- ii. Has the area been noted for specific value to flora and/or fauna such as seed source, nesting, deer yarding, headwaters of a cold spring/river?
- iii. the notable elements?

##### **b. Identifying and Designating Ecological Reference Areas, High Conservation Value Areas and Special Conservation Areas**

- i. All areas with a specific or special conservation objective or value should be placed in one of the three categories. Details (conservation objective, authority) should be clearly documented in the inventory (OI/IFMAP). A list of existing special conservation area types (proposed old growth, recommended natural areas, national natural landmarks, et. al.) is in Appendix B.
- ii. In addition to using statewide and regional assessments (See Appendix F), FMU resource management staff should use their expertise and knowledge of the natural communities and wildlife (terrestrial and aquatic) to identify and compile Ecological Reference Areas, High Conservation Value Areas and Special Conservation Areas as they conduct resource assessments (OI/IFMAP). District and program staff will be available to assist with FMU efforts.
- iii. Designations will be reviewed and documented through the resource assessment/Compartment Review process. Nominations for ERAs, HCVAs and SCAs will be referred to the Biodiversity Conservation Planning Process Teams for further review and approval/denial. A nomination form will be available. The DNR through the Biodiversity Conservation Planning Process will annually review nominations for High Conservation Value Areas (HCVAs) and Ecological Reference Areas on State Forest lands based on qualifying criteria. Statewide, eco-regional and local core teams will have different responsibilities and work at different spatial scales. Incorporating public participation throughout all levels and phases of the process is essential to ensuring that the outcomes properly reflect the social values that Michigan citizens have with respect to conserving biodiversity on State lands.

Figure 2.

## Identification of SCAs, HCVAs, and ERAs in Operations Inventory



Also see Biodiversity Management on State Forest Lands Work Instruction Roles and Responsibilities Section.

### c. Managing and Protecting Ecological Reference Area, High Conservation Value Areas and Special Conservation Areas

- i. Identified ERAs, HCVAs and SCAs will be managed to conserve, protect and/or enhance the defined conservation objective or value. The methods used will vary depending on the objective and type of designation. All areas will be managed to protect the immediate natural resource values or human health and safety.
- ii. Land managers, staff and stand examiners should use technical materials, program staff and/or other references when assessing management options that are suitable for the specific conservation objective. Management options include limited or no treatments (*"let nature take its course, hands-off management"*.)

## 5. GENERAL MANAGEMENT GUIDANCE

**Ecological Reference Areas (ERAs)** serve as models of ecological reference within the State and may be located on any forest land ownership. They are high quality examples of functioning ecosystems that are primarily influenced by natural ecological processes. The MNFI natural community classification system high quality sites serve as the initial base of ERAs. On DNR-managed lands: ERAs may be protected via a variety of mechanisms. Management activities or prescriptions in ERAs are highly restricted to those that maintain or



enhance the defined attributes and values and protect the immediate natural resource values or human health and safety (Table 2).

A statewide GIS layer delineates existing ERAs. This data layer will be updated annually to include new ERAs as they are added to the system.

**High Conservation Value Areas (HCVAs)** are areas that have been recognized for their contribution to specific conservation objectives or attributes through a recognized DNR process such as legislation, administrative rule, Director's and Natural Resource Commission Orders, but not including the Open House/Compartment Review process. Examples of recognized processes include Dedicated Natural, Wilderness or Wild Areas, Natural Rivers, species recovery plans such as Kirtland's Warbler Management Areas, and critical dune areas. HCVAs are a subset of SCAs on state forest land. New HCVA areas also will be designated using the recently approved Biodiversity Conservation planning process.

A statewide GIS layer delineates current HCVAs. This layer is the base that can be used to add additional HCVAs using the Biodiversity Conservation planning process and will be updated annually.

**Special Conservation Areas (SCAs)** are areas of State Forest land that have had one or more conservation objectives, interests, or elements identified. The type and strength of recognition will vary depending on the process used to identify the conservation value. **It is the responsibility of the land manager, management staff and/or OI/FMAP stand examiner to understand the intent of the SCA identification, as well as the implications for management activities.**

**Potential Old Growth (POG) Management Direction:** No vegetative treatments shall occur in areas currently identified in the Operations Inventory (OI) database as Stand Condition 8, potential Old Growth, (Year of Entry prior to 2008) until these stands are assessed in the context of ERAs, HCVAs and SCAs. However, activities that protect immediate natural resource values (such as eradication of invasive exotic pests and wildfire suppression) or human health and safety may be undertaken using DNR procedures (refer to OI Manual Chapter 7, D. Post-Review for guidance) (Table 2).

## **6. MANAGING AND PROTECTING THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES**

### **a. Definitions:**

Endangered (E) species: any species of fish, plant life, or wildlife that is in danger of extinction throughout all or a significant part of its range, other than a species of insect determined by the Department or the secretary of the United States Department of the Interior to constitute a pest whose protection under this part would present an overwhelming and overriding risk to humans. (Part 365, PA 451, 1994, as amended). Endangered species are protected by federal and/or state laws.

Threatened (T) species: any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. (Part 365, PA 451, 1994 as amended). Threatened species are protected by federal and/or state laws.

Special Concern (SC): species with declining or relict populations in Michigan which may become threatened or endangered if declines continue; also included are species which are potentially rare but for which precise information on their status is lacking. The category of Special Concern species was developed by MNFI to identify are species potentially at risk. Although Special Concern species do not have legal protection, the SC descriptor helps identify opportunities to assist at risk species.

Candidate Conservation Species: species for which sufficient information is available to warrant its listing as threatened or endangered under the Federal Endangered Species Act, but for which listing has been precluded due to higher USFWS listing priorities. Currently there are two Candidate

Conservation species identified in Michigan; Eastern Massasauga Rattlesnake and Rayed Bean Mussel.

Critical Habitat: specific geographical areas on which are found those physical or biological features essential to the conservation of a threatened or endangered species and which may require special management considerations or protection. Critical Habitat is identified by the US Fish and Wildlife Service (USFWS) and federally owned lands must be managed in compliance with Critical Habitat requirements. The Critical Habitat designation is not legally binding on non-federal lands however, USFWS partners often work with USFWS to manage for threatened and endangered species. For example, protection for Piping Plover nesting habitat on DNR managed land is mandated through the Land Use Orders of the Director.

#### **b. Legal Requirements:**

Threatened and Endangered species are protected by federal and state endangered species laws (Endangered Species Act of 1973, as amended: 16 U.S.C. §§ 1531–1544; Michigan Endangered Species Protection Law: Part 365, P.A. 451, 1994 as amended).

Any activity on state forestland that may take<sup>3</sup> a T or E species **must** be coordinated with the DNR Endangered Species Coordinator. Permits are required for any activity that results in the take of a T or E species. Permits may be issued only for scientific, zoological, or educational purposes, or for propagation in captivity to ensure survival of a species. The DNR Endangered Species Program coordinates permit requirements for federally listed species with the US Fish and Wildlife Service.

#### **c. Protection and Management**

- i. The objective in all cases is to avoid the taking of T & E listed species.
- ii. Special Concern and Candidate Conservation species, when and where possible, should be treated with similar management consideration as Threatened and Endangered species.
- iii. Protection, maintenance, and/or enhancement of species health and habitat are key objectives.
- iv. Conflicts, or potential conflicts, between species should be referred to the DNR Endangered Species Program Coordinator for assistance.
- v. Data on specific locations of Threatened and Endangered species must not be shared with anyone outside the DNR without express approval of the DNR Endangered Species Coordinator. All comments regarding E/T species for Compartment Review should be placed in “locked comments” in the Operations Inventory database.
- vi. If there is a probability of a listed plant or animal being in or near a proposed forest treatment a field survey may be necessary. Requests for additional survey work should be forwarded through the Forest Management Unit Manager to the Forest Resource Management Section Manager.

There are several hundred listed plants and animals with unique life histories, ecology, and habitat requirements. Many species, especially listed plants and insects, occur together as assemblages within high quality, natural communities. Often, though not always, managing for the community and emulating natural processes benefits the plants and animals. For example, using periodic prescribed fires in fire dependent natural communities such as prairies and savannas also benefits fire dependent plants such as the endangered Oval Leaved Milkweed or the special concern Hill’s thistle.

---

<sup>3</sup> “Take” means, in reference to fish and wildlife, to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. “Take” means, in reference to plants, to collect, pick, cut, dig up, or destroy in any manner. (MCL 324.36501)

Management at larger spatial scales is necessary for some species, such as migrating song birds or interior nesting birds sensitive to increased habitat fragmentation with needs for intact blocks of contiguous forest.

#### d. Resources and Technical Assistance

There is a wide range of data, materials and expertise available on Threatened, Endangered, and Special Concern species.

##### *Gathering data and information*

**Element Occurrence Records (EOR)** provide information on the location of known occurrences of T, E & special concern species. DNR staff may directly access the MNFI database using a MNFI Web Query<sup>4</sup>. Queries should be done for any intrusive activities or treatments undertaken on state forest land. This query is not viewable in a spatial format nor is it available to the general population. **Data on specific locations of Threatened and Endangered species must not be shared with anyone outside the DNR without express approval of the DNR Endangered Species Coordinator.**

**DNR Endangered Species Assessment** web page (<http://www.mcgi.state.mi.us/esa/>) provides a preliminary evaluation of whether endangered, threatened or special concern species, high quality natural communities, or other unique natural features have been known to occur at or near a site of interest. The purpose of this site is to provide a simplified and efficient assessment of rare species and other unique natural features at user identified locations.

This is a publicly available website that is viewable in a spatial format at different scales and backgrounds. It does not provide specific Element Occurrence data.

##### **On the DNR website:**

Michigan T & E species list

[http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin\\_Num=29901021&Dpt=NR&RngHigh](http://www.state.mi.us/orr/emi/admincode.asp?AdminCode=Single&Admin_Num=29901021&Dpt=NR&RngHigh)

Wildlife Conservation Strategy [http://www.michigan.gov/dnr/0,1607,7-153-10370\\_30909---,00.html](http://www.michigan.gov/dnr/0,1607,7-153-10370_30909---,00.html)

GIS based biodiversity information is available on the DNR Intranet

##### **On the MNFI website:**

Special Concern species as well as MNFI species and natural community abstracts

<http://web4.msue.msu.edu/mnfi/home.cfm>

##### **On the NatureServe Explorer website:**

An authoritative source for information on more than 65,000 plants, animals, and ecosystems of the United States and Canada. Explorer includes particularly in-depth coverage for rare and endangered species. Search the database for species or ecological communities & systems.

<http://www.natureserve.org/explorer>.

##### **On the US Fish & Wildlife Service website:**

Federal Recovery Plans [http://ecos.fws.gov/tess\\_public/TESSWebpageRecovery?sort=1](http://ecos.fws.gov/tess_public/TESSWebpageRecovery?sort=1)

**Operations Inventory Year of Entry information** on potential impacts to T/E/SC species and high quality natural communities is provided annually by MNFI. This review provides valuable information to determine if additional survey work is needed and whether management treatments may impact a listed plant or animal.

---

<sup>4</sup> DNR staff should contact MNFI for access information and a password (Jennifer Olsen, [olsenj@michigan.gov](mailto:olsenj@michigan.gov)).

### *Technical Assistance*

**DNR Endangered Species Program:** Authority for the protection and management T/E species rests within the DNR Endangered Species Program via a Cooperative Agreement with the US Fish and Wildlife Service for federally listed species and delegation from the DNR Director for state listed species. The Endangered Species Program is within the Wildlife Division's Natural Heritage Unit. The primary contact is the DNR Endangered Species Coordinator.

Fisheries Division shares responsibility for the protection and management of amphibians and reptiles.

**US Fish and Wildlife Service:** If an activity on state forestland could impact a federally listed species, the DNR Endangered Species Coordinator works with the USFWS to ensure the requirements of the Federal ESA are satisfied. Staff should **not** enter into either informal or formal consultation with the USFWS—all contacts should be through the Endangered Species Coordinator.

**DNR Staff Resources:** There is a variety of programmatic and staff expertise within the DNR related to T/E/SC and biological diversity ranging from birds, mammals, fish and reptiles. Specialists are available locally as well as in District and statewide locations.

**Michigan Natural Features Inventory, Michigan State University Cooperative Extension (MSUE):** MNFI is part of MSUE operating in partnership with DNR and The Nature Conservancy. MNFI manages a comprehensive, statewide and continuously updated database on T/E/SC species and high quality natural communities. MNFI has a professional staff of zoologists, botanists, ecologists who conduct field inventories throughout the state for E/T/SC species and high quality natural communities. MNFI information managers continuously update the MNFI database with new information on the locations and quality of species and natural communities based on MNFI and outside cooperators field inventories.

The DNR has a variety of contracts and agreements with MNFI to provide information, conduct research and surveys, develop abstracts and training and provide consulting services. The availability of specific services is contingent on the specific contract. For information on current contracts or to request additional services, forward requests through the Field Coordinator to the Forest Resource Management Section Manager (FMFM staff only).

Note: MNFI has no legal authority to make permitting decisions for the DNR.

## **7. MANAGING BIODIVERSITY AT THE COMPARTMENT AND STAND LEVEL**

A comprehensive approach to conserving biodiversity within forests incorporates a continuum of conservation approaches from the establishment of large ecological reserves through an array of conservation measures within the forest matrix including the maintenance of individual forest structures at the stand level (Lindemayer & Franklin. 2002).

Statewide and Ecoregional assessments and planning provide spatial perspectives that are broad and intermediate in scope. Forest Management Units, compartments and stands link on-the-ground activities to multiple landscape levels.

The Compartment level is a useful scale to consider human activities including recreational use and trails as well as habitat features, wildlife corridors and the ecosystem mosaic.

The DNR Compartments were developed to coordinate forest management activities and provide a geographic framework for stand level decisions. Compartments were designed with several factors: to be geographically blocked and small enough (1,500 - 3,000 acres) to allow quick visualization of existing conditions and effects of

treatments; to encompass a variety of forest types and ages dispersed across the forest area in each Year of Entry; and to identify forest treatments and work plans annually.

Some DNR Compartments are composed of solid blocks of state land while others have private or other public lands within their boundaries. Diverse ownerships and parcelization of forestland contribute to forest fragmentation and conflicting land use. Regardless of whether a compartment is solid state ownership or interspersed the surrounding lands should be considered in resource assessment and management options.

## Habitat Features

Habitat features are elements of habitat that are important to the organisms living there. Habitat features may be identified at a landscape, stand, or sub-stand scale and vary by importance within and between the ecoregion, section, subsection and natural community (Lindemayer & Franklin. 2002). Habitat features can be either physical or biotic. Some biotic features include travel corridors, deer or elk yards, breeding areas, snags, and stick nests. Examples of physical features include seeps, springs, cliffs, large boulders, glades, Karst – caves and sink holes, and unique shorelines found on the great lakes (See Table 1).

Table 1: Examples of Habitat Features

Landscape Level	Stand Level-Physical (abiotic)	Stand Level-Biotic
Deer yard	Bluff	Snag or group of snags
Travel corridor	Boulder or rock outcrop	Mast trees
	Cave	Raptor nest tree
	Cliff	Den/nest sites other spp..
	Cold spring	Roost
	Dune	Rookery
	Frost pocket	Downed wood, including wind and fire events
	Glade	Log jam
	Intermittent wetland	Insect mound
	Island	Booming, dancing, or strutting grounds
	Karst	Hibernacula
	Seep	
	Sinkhole	
	Vernal pond	
	Waterfall	

Guidance:

DNR forest management staff should be aware of habitat features both within stands and within larger features of which the stand is part of (corridor, yard, etc.) and use protection strategies to conserve these habitat features in day-to-day management of state forest land. Forest managers, Wildlife and Fisheries Biologists should work cooperatively to determine protection and management options for habitat features. The Wildlife Conservation Strategy provides species specific information for managers.

## Forest Stand Structure

The Dictionary of Forestry defines stand structure as:

1. *ecology* the physical and temporal distribution of plants in a stand.
2. *silviculture* the horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, snags, and down wood debris. (Helms, 1998)

A practical approach for managers is in the following paragraph on forest stand structure:

The ability to adequately describe a forest stand might be best judged by our capability to communicate a silvicultural prescription. Silvicultural prescriptions convey ideas of the desired forest and treatments to obtain those conditions. The descriptors used to characterize a forest stand will depend on the needs and available resources for obtaining specific measures. Prescriptions are meant to be used not only by the forester who created the prescription, but by others who must implement and assess the prescription today and in the future. With the increased use of partial harvesting and retention of structural components, it is imperative that managers be able to describe the stand structure that is desired to be retained. (Stone and Porter, 1998)

Stand structure is both dynamic and diverse. The stand structure of an early successional forest (seral stage) is not the same as a late succession stage of the same forest type. For example, young aspen stands do not have significant numbers of standing dead (cavity) trees where older aged stands would include cavity trees.

The benefits of stand structure to biodiversity include increasing structural complexity in canopy and understory and conserving seed banks and residual organisms, soil nutrient pools, reservoirs of soil organic matter, intact nutrient cycle, a well-developed moss, lichens, herbaceous understory, fungi, decomposers, and predators.

Guidance:

Management of stand structure components should be aligned with forest management objectives (social, economic and biological), maintaining and/or increasing biodiversity, and approximating ecological processes, where appropriate and feasible.

### **Forest stand structure applications**

Forest ecosystems in which the vegetation is tall and well stratified generally support a more diverse biota than ecosystems in which most of the vegetation is concentrated in a relatively thin plane (Hunter 1990). In recent years the DNR has embarked on several projects whose purpose is to restore species and structural diversity to managed forests. Two examples include the Red Pine Project and the Interim Guidelines for Mesic Conifers in the West UP. Currently these projects function as tool to aid staff with stand-level management decisions.

**Table 3.** provides specific direction for conserving structural complexity within forest stands based on the 1996 “Dead Wood” memo by Jerry Theide and George Burgoyne.. This guidance should be used as additional guidance is developed in the silvics guides and silvicultural guidelines.

### Table 3: Guidelines for Managing Dead Wood to Enhance Biological Diversity on State Forest Land

#### Selection Cuts

FTP's and timber sale specs should be designed to conserve and enhance dead standing snags, downed woody debris, and dying trees. These components should be protected whenever practical and desirable.

Reserving between 4-10 snag and den trees per acre is optimal for wildlife. It is best to reserve a variety of diameter classes and species.

Reserving uncut patches within northern hardwoods can maintain conifers and mast producers. Patch size ranges from a few trees to an acre or more. It is uncut for many cycles.

Do not remove tops.

Salvage cuts should be designed to leave some dead standing trees and downed wood. This would be most important in large salvage acreage. Consider leaving some potential salvage sales unharvested.

#### Clear Cuts

Cutting specifications can be written requiring all standing dead trees be left standing and that dead and downed trees, and snags or hazard dead trees be cut for safety reasons, be left onsite.

Snags and dying trees may be provided for by excluding a fringe of trees along a stand edge or by marking clumps and patches of short-lived tree species.

Leaving variable width buffer zones along wetlands, small streams, and vernal ponds will add structural diversity as leave trees die and fall.

In some cases, cutting to water's edge may benefit certain wildlife and plant species.

#### Safety Considerations

Contractors should be allowed to fell snags they judge to be a hazard. These snags should be left as woody debris. MIOSHA does not require that fallen snags be removed.

It is the timber producer or contractor who, under MIOSHA, is legally responsible for making decisions on whether a tree is safe to cut.

Safety considerations may be a reason to not leave snags or downed tops along trails, roads, or other used areas.

Visible snags may stimulate fuel wood permit demands or create a visual concern. They may also be an opportunity to educate the public on dead wood values.

Snags left on the site will be a larger hazard to manual fellers and manual regeneration methods than those of mechanical nature.

If a leave tree is particularly valuable, it may be desirable to not mark any trees near it for the next 10-20 years.

Leaving relatively sound, poor quality trees that are nearly dead, or can be girdled, may also be a safer alternative

#### ADDITIONAL CONSIDERATIONS:

**Diversity is important.** Size, height, location, tree species, and degree of decay are all important considerations when writing cutting specifications.

**Bigger is better.** More species can use larger cavities (larger snags) and is considered more valuable than a small one

When large snags fall, they leave more woody debris, last for more years, and are used by a greater variety of species than small ones.

**Consider height.** Studies have shown that taller snags are used more readily than short snags of the same diameter.

**Leftovers from cutting operations.** Woody debris resulting from cutting operations, such as chip piles and slash left at a landing site, provides good habitat for small mammals, amphibians and reptiles, and many smaller life forms.

**Protection for plans and tree reproduction.** Leaving tops and down woody debris will protect many small plants and tree seedlings from over-browsing by herbivores such as deer and elk. Lopping of tops tends to eliminate this value and shortens the longevity of the woody debris.

**Look beyond the stand level.** Use the surrounding landscape and adjacent cover types to help determine the appropriate numbers, sizes, and species mixes of snags to leave and where to leave them.

Adjacent compartments that have less snags may suggest a need to leave more in this compartment.

A large clear cut will reduce snags and woody debris over a larger area than a small checkerboard cut. Leaving snags, clumps of snags, or small longer-rotation patches, would be important.

Leaving clumps of hemlock, pine, or other conifers may be desirable to add diversity, especially in compartments where conifer cover is limited.

**Think treatment, not harvest.** Consider this when designing cutting specifications

**Not the last word.** It is essential to keep practicality, efficiency, and safety in mind when designing forest treatments.

Citations:

Helms, John A., Editor The Dictionary of Forestry, The Society of American Foresters, 1998.

Hunter, M. L. 1990. Wildlife, forests, and forestry: principles of managing forests for biological diversity. Prentice-Hall Inc., Englewood Cliffs, N.J. 370pp.

Lindenmayer, D. B. & J. F. Franklin. 2002. Conserving Forest Biodiversity. A Comprehensive Multiscaled Approach. Island Press, Washington, D.C. 351 pp.

Conserving Forest Biodiversity (2002) lists conservation strategies that include protecting stand level biodiversity. Examples include maintaining, enhancing or creating structural complexity by retaining structures and organisms at the time of harvest or through stand management activities; and protecting habitats at the stand level that accumulate at intermediate spatial scales, i.e. aquatic ecosystems and riparian buffers; wildlife corridors; culturally sensitive areas; special habitats; biological hotspots; fire, wind and other disturbance refugia.

Stone, Jeff N. and Janet L. Porter, *What is Forest Stand Structure and How to Measure It?*, Northwest Science, Vol. 72, Special Issue No. 2, 1998

Theide, J. & G. Burgoyne. April 17, 1996 Inter office memo regarding Dead Wood management on state forest lands.

Reference:

Stand Level Biodiversity web-based training course, Ministry of Forests, British Columbia, Canada. March 2002. <http://www.for.gov.bc.ca/hfp/fordev/biodiversity/index.htm#contents>



# Biodiversity Conservation Planning Process

*April 2005*

*Approved by Statewide Council*

Submitted by  
Biodiversity Conservation Committee:

Maureen McDonough, Facilitator, MSU-Forestry  
Georgia Peterson, Facilitator, DNR-Forest, Mineral & Fire  
Management/MSU-Forestry  
Debbie Begalle, DNR-Forest, Mineral & Fire Management  
Cara Boucher, DNR-Forest, Mineral & Fire Management  
Ray Fahlsing, DNR-Parks & Recreation  
Rich Hausler, DNR-Forest, Mineral & Fire Management  
Sherry MacKinnon, DNR-Wildlife  
Brian Mastenbrook, DNR-Wildlife  
William O'Neill, DNR-Forest, Mineral & Fire Management  
Scott Whitcomb, DNR-Wildlife  
Troy Zorn, DNR-Fisheries  
Matthew A. Tonello, Mapping Assistance



Michigan Department of Natural Resources  
Forest, Mineral & Fire Management

## Purpose

The purpose of the document is to describe the process developed by the Biodiversity Conservation Committee (BCC)<sup>5</sup> to establish a network of functional representative Michigan ecosystems on a portion of Michigan Department of Natural Resources (MDNR) administered lands. It also establishes a strategy to conserve biological diversity on all Department administered lands and to cooperate with other landowners, to conserve, restore and protect the biological diversity of Michigan.

The MDNR's Biodiversity Conservation Committee was formed for the purpose of developing a plan, named the "MDNR Biodiversity Conservation Plan", that will ensure the conservation, maintenance and restoration of Michigan's native biodiversity on MDNR administered lands. The BCC was challenged to develop a plan which conserves Michigan's biodiversity heritage and legacy while smoothly interfacing with other current and future MDNR resource planning and assessment efforts. Furthermore, the BCC was assigned the task of devising a decision making process which is transparent and responsive to internal agency concerns, as well as key stakeholder groups and citizens.

The MDNR will manage lands included in this network with conservation of biological diversity as the primary goal. Key elements to this plan are:

- Establish an organizational infrastructure consisting of multiple design teams who will work at state, eco-regional and local spatial scales.
- Apply the principles of the Biodiversity Conservation plan consistently throughout the State.
- Select parcels of land for inclusion based on three primary elements as outlined in the Public Advisory Team (PAT) recommendations: 1) ecosystem representation, 2) functionality, and 3) quality and condition.
- Design an integrated public participation process, working cooperatively with individual citizens, conservation and environmental organizations, forest products industry and other state and federal land management agencies.
- Integrate, implement and coordinate with the eco-regional planning process.
- Provide practical and specific guidance for site selection and management that applies the principles of adaptive management.

## Background

In 1992, the Governor approved legislation that was then codified as the Biological Diversity Conservation Act. It has now been re-codified as Part 355, 1994 PA 451. This legislation declares that "It is the goal of this state to encourage the lasting conservation of biological diversity." Part 355 directed the legislature to "prepare a recommended state strategy for conservation of biological diversity...." While Michigan's legislature did not follow up on this directive, the MDNR Director declared that the Department will take "an ecosystem approach to decision-making."

In 1995, the Natural Resources Commission approved an addendum to the Statewide Forest Resource Plan entitled, "Old Growth and State Forest Lands". Old growth forests were defined as "those that approximate the structure, composition and functions of native forests". In 2001, after several years of effort, the MDNR published the report, "Proposed Old Growth and Biodiversity

---

<sup>5</sup> There were additional committee members who had to leave the committee due to other duties that prevented them from further participation: John Pilon, FMFM; Lee Verberkemoes, Parks and Recreation; Paul Seelbach and Tom Rozich, Fisheries.

Conservation and Stewardship Planning Process and Draft Criteria for Michigan's State Forests and Other State Owned Lands". This report was reviewed and commented on by a public advisory team (PAT) consisting of various individuals representing conservation, environmental and forest products interests. The MDNR staff did not formally serve on this team. However, several staff were present at every meeting to provide administrative support and background information.

The PAT met numerous times over the period of a year. All meetings were facilitated by Michigan State University Extension staff. It issued a 21-page report to the MDNR in May 2002. The key recommendation coming from this effort is that the MDNR should change the emphasis from conserving or restoring native old growth forested systems to conserving and restoring some portion of the native biological diversity of Michigan by conserving and restoring "functional" representative native ecosystems. "Functional" is defined in the PAT report as, "the ability of a given area to maintain healthy, viable species, communities or ecological systems for a minimum of 100 years, including the ability to respond to natural or human-caused environmental change".

The PAT report (see Sub-Appendix A) recommended the use of three guiding principles or elements as the basis the MDNR would implement a statewide biodiversity conservation program:

1. Ecosystem Representation – A statewide biodiversity conservation plan should "contain, to the extent possible, multiple examples of all native species and ecological communities in sufficient number, distribution and quality to ensure their long-term persistence..."
2. Functionality – An area or landscape designated for biodiversity conservation management should "maintain focal species, communities, systems and supporting ecological processes within their natural ranges of variability".
3. Quality and Condition – Seek to include those areas having high abundance of rare, threatened or endangered species or natural communities, as well as areas having minimal human impact.

After the PAT issued its report, the MDNR established an internal committee known as the Biodiversity Conservation Committee. It was composed of representatives from Wildlife, Fisheries, Parks and Recreation and Forest, Mineral and Fire Management. It was charged with:

1. Reviewing the PAT report and determining which concepts and recommendations could be incorporated into a statewide biodiversity conservation plan.
2. Determining how biodiversity conservation on MDNR administered lands will occur given multiple use management mandates (e.g. social, economic and legislative mandates and demands).
3. Designing the BCC plan to fit into the existing eco-regional planning team structure and other various resource assessment and management processes (e.g. operations inventory and IFMAP)
4. Use geographic information system technology and data as the foundation for site selection and overall development of a biodiversity conservation network.

## **Proposed Plan**

Appendix B is a flowchart framework illustrating the proposed selection process for parcels for inclusion in the Biodiversity Conservation network. The BCC proposes an organizational structure to incorporate the current eco-regional team structure. The BCC recommends that three types of teams be created using a hierarchical structure as the basis for these teams. Each team type will have different responsibilities and work at different spatial scales. Please note that for each eco-region, a

set of core design teams will be used and the number of core design teams within each eco-region may vary according to the biodiversity conservation needs in that particular eco-region.

The team types are as follows:

1. The Statewide team – this team will oversee the entire planning process. It has the overarching responsibility to insure that the selection process is applied consistently throughout the State.
2. Eco-regional team – There are four eco-regional teams. They are charged with planning and coordinating management of Michigan's natural resources utilizing ecosystem management principles. Their geographic responsibilities are the Southern Lower, Northern Lower, Eastern Upper and Western Upper Peninsulas.
3. The core design teams – These teams are nested within a given eco-region team. The eco-region team will be responsible for assembling this team using existing MDNR field staff. It is this team that will identify and recommend specific sites and parcels of land for inclusion in the biodiversity conservation network. This is also the team that will work with local stakeholders about the biodiversity conservation process in identifying candidate sites/communities.

## **The Process**

Biodiversity exists at many levels of biological organization (i.e. genetic, species, communities, ecosystems and landscapes). Biodiversity also occurs at a variety of spatial scales, from a few square feet to millions of acres. The proposed process is based on integrating these biological and spatial relationships to develop a network of sites and management strategies that conserves and restores some portion of Michigan's biological diversity legacy. As such, the biodiversity conservation process is based on the filtering concept in which the process moves from coarse filters (e.g. Michigan Natural Features Inventory natural community types throughout Michigan) to using fine filters (selecting sites from several to hundreds of acres based on knowledge of local ecology and specific knowledge of species location and habitat).

The Statewide team will be responsible for planning for biodiversity conservation at the broadest level (i.e. looking at the entire state of Michigan). As illustrated in the flowchart in Sub-Appendix B, the responsibilities of the Statewide team will occur in the following manner:

1. The Statewide team identifies the general distribution and quantity of each of the 74 Michigan Natural Features Inventory natural community types which exists now and in the past. This also includes the large task of identifying biophysical data sources and those spatial and tabular analyses that will be needed. The team should strive to identify any significant variations in natural community types.
2. The Statewide team defines conservation objectives and targets and values for each community type. Key tasks include determining community uniqueness and rarity, threats to the ecological health of a given natural community, and potential for conservation of a given natural community.
3. Determine and rate the quality, condition and functionality of a natural community over the landscape of Michigan. Also, the team must rate the potential to preserve the quality, condition and functionality of a natural community ecosystem(s) and natural processes over the next century. This will involve defining the importance of various ecological criteria to maintain or restore biodiversity within a natural community and its surrounding landscape.

4. Identify Statewide social and economic trends, as well as social and economic constraints to conserving biodiversity in any given landscape. This will involve further refinement in the identification of biophysical data requirements.
5. Provide information, data and direction to the four eco-regional teams to allow the eco-regional teams to move ahead with the biodiversity conservation process. This includes:
  - a. List of conservation objectives associated with each community type.
  - b. Checklist of ecological criteria important for each conservation objective.
  - c. Relevant economic & social data, definitions and profiles.
  - d. Relevant biophysical data.
  - e. Suggested list of other planning processes to connect with.
  - f. Announcements to interested outside groups.

The second phase of this process involves action and decision making by the four eco-regional teams. For each team, the following should occur:

1. The eco-regional team must identify conservation objectives, targets and values specific to its given eco-region, in addition to the guidance and information provided by the Statewide team. Key tasks include determining community uniqueness and rarity, threats to the ecological health of a given natural community, and potential for preservation and/or restoration of biodiversity and ecology. In addition, an eco-regional team must compare those eco-regional specific conservation objectives with those identified by the Statewide team for a given community type. The eco-regional team will submit these objectives to the Statewide team for their review and comment.
2. The eco-regional team shall identify regional and local socio-economic data sources that augments and complements Statewide data. This data will be used to examine and analyze constraints that are more local in their impacts on selecting lands for inclusion in the biodiversity conservation plan.
3. The eco-regional team will also identify any research and documentation that has been developed with respect to criteria and indicators, such as those identified in 1999 for the State Forests located in Eastern Upper Peninsula.
4. The eco-regional team will designate personnel to serve on a “core” team. The core team will be the key entity responsible for selecting areas using the guidance, information and data developed by the Statewide and eco teams.

## **The Core Team**

This phase of the biodiversity conservation planning process is where specific parcels of land are nominated for inclusion into the biodiversity network. It is at this phase where knowledge and input of local ecological and forest conditions are sought from MDNR staff, as well as professional resource management staff from other land management agencies and conservation organizations. Each core team needs to accomplish the following to insure the successful implementation of the MDNR biodiversity conservation plan.

1. Identify specific geographic areas or parcels for inclusion into the plan. This will involve locating the desired natural communities based on specific conservation objectives. Begin providing information to local stakeholders and identifying participants for selection process.
2. Determine the spatial arrangement of areas based on the general criteria of ecologic functionality and site quality and condition. Areas and communities will also be selected on their ability to be sustained over a significant period of time (e.g. 100 years) and large enough to conserve the targeted flora and fauna located within.

3. The core team shall review and consider other planning efforts occurring locally on state, federal, and private lands and consider how these efforts will affect or be affected by biodiversity conservation planning.
4. The core teams will review and analyze information compiled in previous steps.
5. Identify potential sites by working with local stakeholders. The core design teams will list those sites that conform to PAT recommendations and constraints as formulated by eco-regional team.
6. Within a given locality, the core teams will prioritize and rank the identified sites as based on how each site best meets all pertinent criteria and conservation objectives.
7. The core teams shall assemble all recommendations, rearrange and/or rank as needed for the larger eco-regional landscape. The core teams shall provide reports to the eco-regional and Statewide teams.

## **Public Participation: Awareness, Information & Outreach**

Incorporating public participation throughout all phases of this project is essential to ensuring that the outcomes properly reflect the social values that Michigan citizens have with respect to conserving biodiversity on State lands. Therefore, the BCC recommends active public participation on all levels. The following are some examples of this:

### Statewide examples:

1. Establish/maintain web page in “Forests, Land & Water” section of MDNR website that lists the history, timeline, supporting documentation and latest happenings. Provide on-line connection to offer comments on the process, including a running summary of all comments for on-line visitors to view.
2. Maintain electronic listserv that also provides opportunities for on-line comments and announcements.
3. Update list of organizations and agencies (statewide, regional, and local) who are potentially interested in the Biodiversity Conservation process. Provide executive summary and future intentions to these groups.
4. Develop a “canned” presentation of the Biodiversity Conservation process that can be offered at organizational and agency functions.
5. Discuss products as identified in Sub-Appendix C, item 1d (e.g. conservation objectives list, ecological criteria checklists), with the Public Advisory Team.

### Eco-team level examples:

1. Update and maintain list of regional organizations and individuals who are interested in the Biodiversity Conservation process.
2. Modify “canned” presentation to fit regional needs, delivering it to local or regional organizational events.
3. Include findings, changes, and recommended Biodiversity sites in compartment reviews and open houses.

### Core design team examples:

1. Use list of interested groups and individuals—identified by eco-regional teams—to provide information about the candidate site selection process. Provide a mechanism for comments, feedback, etc.
2. Contact interested stakeholders again when candidate State and non-State-managed sites have been identified, including participants in the site selection process using workshops or other interactive techniques.

3. Use core design team results and local input to select recommended sites. Provide recommended site information to all interested stakeholders for comment and feedback. Note: There is an iterative aspect to this portion of the process where recommended sites are reviewed and adjustments considered at least once (depending on the situation) with stakeholders. At the same time, the core team should not fall into an endless review loop.

## **Resources Required for Plan Implementation**

Implementation of a plan of this magnitude will require a significant commitment by the MDNR. With respect to biodiversity conservation planning, an endeavor of this magnitude has not been done by any state natural resources agency within the Midwest for lands that it administers. A clear lack of data and information exists with respect to the location and quality of natural communities on State Forest lands.

To implement this plan, the following actions are required by the DNR:

1. Establish a partnership with the Michigan Natural Features Inventory to inventory State Forest lands to determine the location, quality and condition of the 74 possible natural communities found in Michigan.
2. Create a Statewide team.
3. Create a set of core design teams that will operate within each eco-region respectively.
4. Set up a training program for field staff.
5. Appoint or hire a staff person responsible for ensuring that the MDNR is implementing the plan in a timely manner and who will serve as the point person for ensuring that information is exchanged properly and thoroughly between the teams, MDNR management, field staff and interested stakeholders.

Implementing this plan requires the MDNR to apply the principles of adaptive management whereby the following should occur:

1. Management recommendations for selected sites will need to be identified and integrated with other existing inventory processes.
2. A system of lands is selected for its contribution to conserving various elements of Michigan's biodiversity heritage.
3. Site specific management for maintenance and restoration of biodiversity elements and ecological function.
4. Monitor and document how management actions meet conservation objectives for a given site and for the overall biodiversity network of lands.
5. A process and procedures for adding or deleting parcels of land in the established network.

Committing the resources to implementing the proposed Biodiversity Conservation plan as proposed represents a bold step by the MDNR to conserve Michigan's biodiversity heritage while maintaining its commitment to the multiple use of State Forest and other State-owned lands.

Finally, the committee recognizes that integrating aquatic systems in the biodiversity conservation process is important. However, given the magnitude of scope and workload in addressing terrestrial ecosystems, the committee focused its initial efforts on terrestrial ecosystems.

## SUB-APPENDIX A

# PUBLIC ADVISORY TEAM (PAT) RECOMMENDATIONS AND COMMENTS ON OLD GROWTH/BIODIVERSITY STEWARDSHIP (OG/BS) REPORT

### INTRODUCTION

The PAT was convened and asked to comment on the Michigan Department of Natural Resources' (MDNR) OG/BS Report dated February 8, 2001. This document includes comments and recommendations for the MDNR to consider as they continue in the OG/BS planning process. The concepts in this document should be considered in their entirety; they are intricately connected and complex.

The PAT strongly recommends that:

- This document be technically reviewed and include supporting documentation (citations).
- Staff be trained appropriately.
- All State-owned land (recreation areas, state parks, game areas) and other land ownership be considered for their contributions to OG/BS goals.
- The MDNR clearly understands and is able to communicate the concepts and goals of the OG/BS process to internal and external groups.
- Consideration is given to re-naming the OG/BS process to better reflect the objectives stated in the goal statement (below).

**The goal of the OG/BS program is to represent, in a functional condition, native Michigan ecosystems on a portion of State-owned lands, in cooperation with other landowners, to conserve, restore, and protect the biological diversity of Michigan.**

To implement the OG/BS goal, the PAT envisions that the MDNR will use the combination of three elements: **Ecosystem Representation, Functionality, and Quality and Condition**. Each of these elements has criteria and considerations that specify the parameters and gives explanation of the elements. The MDNR will use this system to design conservation areas that meet the OG/BS goal.

### ECOSYSTEM REPRESENTATION

Representation is “a principle ... referring to the capture of the full spectrum of biological and environmental variation within a network of reserves or conservation sites, including all gene pools, species, communities, ecosystems, habitats, and landscapes” (Designing a Geography of Hope, The Nature Conservancy, 2000). The scope of this definition extends from the most distinctive of biological entities (gene pools) to the broadest of ecological units (ecosystems). As such, it covers both the “fine filter” and “coarse filter” ends of the conservation spectrum. For the OG/BS process, “ecosystem representation” refers to the degree to which the native ecosystems (LTAs or ELUs) are represented in functional landscapes within each subsection.

Overall, the OG/BS design should contain, to the extent possible, multiple examples of all native species and ecological communities in sufficient number, distribution, and quality to ensure their long-term persistence within the State of Michigan. Taking a coarse filter approach assumes that if the coarse filter components of biodiversity are captured, the fine filter components will also be captured. It also makes the design and implementation of the process a great deal simpler, as the information on the different types and locations of ecosystems is more readily available than information on natural communities and species. However, the validity of the assumption depends on the level of resolution of the classification of native ecosystems and the inherent variation within the different types. For example, LTAs defined at a broad level of the classification may contain very different types of local ecosystems and natural communities. So, to the extent that some LTAs are more internally variable than others, representation of those LTAs in the design should be evaluated



for how well the internal variation is captured. Because there is no comprehensive list or map of the natural communities and species that occur in the native ecosystems, no numeric guidelines can be recommended. But, as a general principle, those native ecosystems with high variation may need to be conserved in a greater number of sites and with a greater degree of geographic stratification than those types with less variation.

Modified from the guidelines used by The Nature Conservancy, the criteria for representation (number per subsection) are set based on the spatial pattern, and geographic distribution and appear in the table below. See the Glossary for definitions of specific classes of spatial pattern and geographic distribution.




#### Criteria:

1) Represent the LTA or ELU in OG/BS areas the number of times recommended in the table below:

Distribution		Geographic Scale and Spatial Pattern		
		Matrix Forming	Large Patch*	Small Patch*
	<b>Restricted/Endemic</b>	At least 1	3	5
	<b>Limited</b>	At least 1	3	5
	<b>Widespread</b>	At least 1	2	3

\* These figures are to serve as a demonstration of proportionality, not exact numeric requirements.



#### Considerations:

-  *The design should contain multiple examples of all conservation targets in sufficient number, distribution, and quality to ensure their long-term persistence within the State of Michigan.*
-  *As a general principle, those communities with high variation may need to be conserved in a greater number of sites and with a greater degree of geographic stratification than those types with less variation.*
-  *Since the UP does not have mapped units at the same scale as the LP, the design teams should map ELUs that are roughly equivalent to those of the LP, if possible. If this is not possible, use sources already available in the MDNR. Use common LTAs, if available in the near future. If not, use existing LTAs, with representation by common landform feature, i.e. moraine, outwash plain, embayment, etc. Review to see if you have missed any important features (see subsequent sections), rely on field staff and local knowledge for this information.*

### FUNCTIONALITY

A functional conservation area maintains the focal species, communities, and/or systems, and their supporting ecological processes within their natural ranges of variability (The Nature Conservancy).

#### Considerations:

-  *To maintain viable systems, context and connectivity should be considered where they can enhance the viability of small or rare ecological systems.*
-  *The importance of these elements and criteria will vary with the conservation targets and goals.*

*For Example:*






- *Size is most important for matrix forming communities and wide ranging species.*

- *Landscape context and connectivity will be important for smaller patch communities (vernal pools, Canada yew hardwoods) and dispersal-dominated species populations (small mammals, amphibians).*
- *Continuous cover will be most important for forest interior species and fire dependant communities.*
- *One characteristic may compensate for another.*
- *More internal fragmentation may be acceptable in larger conservation areas.*

### **Landscape Context Criteria:**

- 1) Choose a landscape context in which the function of the potential OG/BS area is not significantly impaired.





#### *Considerations:*

-  *Nesting—select sites in which large and small patch communities are nested within the larger matrix.*
-  Proximity—when possible, select areas that have clusters of small patches near each other as opposed to those that are farther apart.
-  Look at the surrounding landscape and determine if the values for which a proposed potential OG/BS area has been selected are significantly impaired by the context in which it occurs.
  - *For example, a small isolated block of old trees surrounded by habitats or conditions unsuitable for the conservation targets (i.e., gas wells and roads) may not be a functional old growth system.*
  - *On the other hand, if the surrounding lands can be restored over time, then these currently isolated blocks may be a better choice than another area with less fragmentation but dominated by younger stands where natural composition and structure is less well developed.*
-  *The current or projected future activities in the surrounding area should be evaluated relative to the long-term viability of the species or community of concern. The requirements of the individual species, species association or community of concern should determine what adjacent activities are compatible and appropriate.*
-  *Context includes looking at areas in other ownerships: OG/BS should assess the ability to complement other protected areas and how these areas achieve some of those requirements for conservation targets over the long term.*

### **Block Size Criteria:**

- 1) The size of OG/BS areas, or complexes of these areas, should be reflective of target species' home ranges, and life history needs.
- 2) The blocks are of sufficient size and/or distribution to allow the ecological targets to persist, or recover from, disturbances characteristic of the site.

#### *Considerations:*

-  *Consider the risk of loss due to catastrophic events to a single unique large block.*
-  *Larger blocks are more functionally intact and are less common than smaller blocks, and therefore are preferred.*
-  *Complexes (of blocks) with connectivity can be considered when addressing the size question.*
-  *Look for opportunities to increase representation within OG/BS areas by designing them so they cross ecological boundaries.*



*Size should consider these factors:*

- i. Energy capture*
- ii. Reproduction*
- iii. Genetic mixing*
- iv. Refugia*
- v. Migration*
- vi. And other spatial life history needs*

### **Connectivity Criteria:**

- 1) The connectivity of the system should be determined based on the use requirements for the species of concern in that area.

*Considerations:*



*Connectivity is to be developed through large-scale landscape-level considerations.*



*OG/BS lands that are connected or in proximity to other natural habitat are preferred to isolated areas surrounded by a human-dominated matrix.*



*Connectivity is not just about corridors. Connectivity can be accomplished by:*

- Corridors*
- Proximity*
- Or surrounding land use conditions that are compatible with conservation targets.*



*In some cases, connectivity may be discontinuous as long as there are “stepping stones” for the target species.*



*Connectivity along waterways is especially useful because of the many ecological values riparian areas provide.*



*Biodiversity may be enhanced when wetlands are linked to uplands.*



*Connections should not exclusively be riparian or upland. Both are important.*



*Connectivity is especially important between small patch communities. They may need the surrounding matrix to persist.*



*Important questions regarding the connectivity of the OG/BS:*

*Do target species have access to all habitats and resources needed to complete their life cycles?  
(scale: OG/BS area)*

*Are all spatial needs for energy capture, reproduction, genetic mixing, refugia, migration, and so forth met for the conservation targets of the OG/BS? (scale: OG/BS area)*

*Will the connectivity enhance the resiliency of the target species? (scale: OG/BS area)*

*Changes in ecological systems and communities are an ongoing process, but evidence suggests that the current climatic changes, coupled with changes in land use, create additional threats to biodiversity that could be partly abated through establishing connectivity (see discussion of the issue of climate change in Appendix B). Specifically, can species migrate or disperse among natural areas (statewide issue)? And, can ecological systems and communities adapt to environmental changes such as climate change (local area issue)?*



*Non-OG/BS designated lands, may provide connectivity. Management prescriptions and objectives*

*that will sustain connectivity should be identified and promoted over the long-term.*

## **QUALITY AND CONDITION**

Quality of an OG/BS conservation area is a subjective assessment that refers to an area's potential for meeting the overall goals of the program. It is at this point in the OG/BS process that emphasis should be given to the rare and unique elements of Michigan's native flora and fauna. Rare and unique species, species associations and communities contribute disproportionately to the biodiversity of the State and require attention within the OG/BS conservation area network.

The condition of a proposed conservation area references the degree to which current composition, structure and on-going processes contribute to the viability of the conservation targets. Evidence of biological legacy and historical continuity are indicators of good condition, whereas significant anthropogenic disturbance, drastic shifts in land use, species and structural simplification, and presence of invasive species, may indicate conditions that would jeopardize the long-term viability of the conservation targets.






### **Criteria:**

Give preference to:



- 1) Those areas that have unique species, species associations and communities.
- 2) Older rather than younger stands in ecosystems where conservation targets, at the species or communities level, are dependent on late successional features and processes.
- 3) Those places within LTAs that most closely represent what is understood as a natural system (composition, structure and condition).
- 4) Areas with the greatest evidence of a) biological legacies or b) historic continuity.

### *Considerations:*

#### *Rare and unique species:*

-  *The future management of OG/BS areas should be tailored to the needs of the rare species or community, where such management is critical to their continued persistence.*
-  *A shifting mosaic of successional stages in an OG/BS area should be managed to the benefit of the species, species associations, or community (the conservation targets) that initially drove the designation decision.*
-  *The level of disturbance in OG/BS blocks should, to the extent possible, reflect the natural disturbance regime native to the area. If this disturbance regime has been altered by management actions, or the current landscape structure (roads, housing developments etc.) inhibits ecological regimes, then active restoration management may be needed to maintain conservation targets within the area, especially for rare or unique species or communities.*
-  *These native conditions in many cases include early successional stages of vegetation, frequent disturbance regimes or other processes and features.*
-  *Specific knowledge of MDNR staff or other local individuals and organizations should be utilized in locating and mapping these sites.*

#### *Time since last disturbance, and biological legacies:*

-  *The structure and composition of an ecosystem is a key determining factor for the presence of species and the associated processes that sustain them.*
-  *Information about the time since the last disturbance, and the intensity/severity of that disturbance can help with the initial selection of candidate sites.*



*Examples of biological legacies may be, but not limited to:*

- a. dead and rotten wood*
- b. standing snags*
- c. seed banks and residual organisms*
- d. soil nutrient pools*
- e. reservoir of soil organic matter*
- f. seed banks*
- g. intact nutrient cycles*
- h. a well-developed moss, lichens, herbaceous understory*
- i. structural complexity in canopy and understory*
- j. fungi, decomposers, and predators*



*Specific knowledge of MDNR staff or other individuals and organizations should be utilized, in locating and mapping sites with biological legacies and areas with less anthropogenic disturbance.*

## **SUB-APPENDIX A(1)**

### **Additional Information and Background Material on Landtype Associations**

#### **What is a Landtype Association?**

Landtype Associations (LTAs) are areas defined by multiple biological and physical factors, including landform, topography, soil, and vegetation (Minnesota Department of Natural Resources, 2000). They can be hundreds to thousands of acres in size. They are part of a national system of ecological land units, comprising eight different scale classes that allow scientists and managers to consider ecological patterns at any scale. LTAs have been identified, classified, and mapped for the Great Lake States (excepting southern Lower Michigan), and the information about LTAs is available on the website of the Great Lakes Ecological Assessment (<http://www.ncrs.fs.fed.us/gla/>).

In Michigan, the system of ecological land units at broader scales than LTAs has been delineated by Dennis Albert of the Michigan Natural Features Inventory (MNFI) (Albert 1996). There are three levels of land units: Sections, Subsections, and Sub-subsections, with each subsequently smaller level being nested within the larger units of the level above. LTAs represent the next smaller scale of ecological land unit below the Subsection or Sub-subsection (hereafter referred to, for simplicity's sake, simply as Subsections).

LTAs have been mapped in the Northern Lower Peninsula (MNFI, 1999) and the Upper Peninsula (UP) through integration of the factors mentioned above: climate, soil, topography, and vegetation. In the Northern Lower Peninsula, MNFI classified and mapped LTAs in a nested, hierarchical structure, so that LTAs can be easily grouped by factors such as major landform, soil type, or soil drainage class depending on the level of resolution desired by the user. These LTAs occur multiple times within a Subsection and with the information provided in the LTA reports, it is fairly straightforward to characterize a Subsection in terms of the different kinds of LTAs that occur, the spatial scale of each LTA (i.e., how large it is), the number of times each LTA occurs, and the geographic distribution of each LTA. Knowing these characteristics allows planners to set numeric criteria for representing different types of native ecosystems. In the UP, LTAs have been classified and mapped somewhat differently, with each LTA being large and unique. These LTAs are also nested within an ecological hierarchy, but are different in that each LTA is given a unique number. To assign equivalent criteria for representation for both the Northern Lower Peninsula and the Upper Peninsula will require that the LTAs be grouped by some like factor, such as major landform type.

## SUB-APPENDIX A (2)

### Relevance of Climate Change to the OG/BS Design Process

Climate change could have a significant impact on biodiversity. In the upper Great Lakes region, as in other glaciated regions, climatic changes have been a constant reality as glaciers advanced and receded during glacial and interglacial cycles. Plants and animals have had to both disperse in response to these climatic changes and adapt to newly-created landforms and soils. It is widely accepted that the composition of natural communities has not remained constant but has been continually changing as species disperse and expand or contract their ranges at differing rates. So, the climatic changes that we are experiencing now should be expected to result in different plant and animal communities in ecosystems of Michigan.

As we compare the current climatic changes to past ones, two important differences are apparent, both of which have bearing on biological diversity. First, the climate is warming and is expected to continue to warm. Second, the ecoregions through which plants and animals will need to disperse or migrate are far less hospitable and traversable due to the drastic changes wrought by human activities. The combined effects of these two factors could result in greater rates of extinction than might have occurred in the past.

These factors should be considered in the OG/BS design with respect to two of the design criteria, representation and connectivity.

- Representation of ecological systems within a particular OG/BS area should be maximized to better enable ecological systems to adapt to changes (e.g., changes in groundwater hydrology in response to changes in precipitation and temperature). **This consideration applies at the local scale.**
- Connectivity among OG/BS areas throughout the State should provide, to the extent possible, for movement and dispersal of animals and plants. Due to the high variation among species with regard to requirements for dispersal and migration, no general recommendation applies. **This consideration applies at the State-wide scale.**

## SUB-APPENDIX A (3)

### Compiled Comments on OGBS Report

*Note: Acronyms at the beginning of each item indicate the source of the text. SC=Sierra Club; RGS=Ruffed Grouse Society; MFPC=Michigan Forest Products Council; TU=Trout Unlimited; MAT=Michigan Association of Timbermen.*

#### Opening Statement

SC-- Site-specific guidance will be created during the designation of OG/BS areas. [We think this type of statement is critical to have as part of the OG/BS process. If not stated here, we should include it somewhere in the PAT's recommendations to the State]

MFPC—I would recommend the OG/BS process include a written justification and rationale for candidate sites. Once sites are accepted into the OG/BS network, short-term and long-term objectives and a written management plan should be prepared. I believe this would meet the Sierra Club's desires for "specific guidance". The written plan should also have a monitoring provision and some periodic measure of progress.

The issue of selection, evaluation for inclusion, planning, and management guidance should be addressed in the body of the document.

#### 1. Timber Harvest and Silvicultural Work

RGS--Timber harvesting and silvicultural work should be used as much or as little as necessary to achieve the goals as set by the conservation target for that specific OG/BS area.

MFPC--the restriction on "active management" is not appropriate. As we have repeatedly discussed, not all biodiversity reserves to be designated in the OG/BS Planning Process are old growth; in fact, many are early-successional. This wording precludes the State from performing "active management" to retain that condition. Overstory removal in alvar or remnant prairie communities, eradication of exotic species by mechanical or chemical means, or even controlled burning, would not be allowed under this wording.

TU--I have a concern with exclusion of active management areas from consideration. I feel any area should be considered in the assessment for inclusion into the OG/BS selection process. I also find some designated areas may require "active management" to allow them to conform/establish to certain community types if included into an OG/BS area.

MAT-- Active management should not be prohibited from any of this process, except where it comes in violation of the State's BMPs. There may be occasions where the choice to preclude active management may come into play, but the choice must come from the managers who are actually making the choices in the field.

SC-- All active management will leave all biomass on site, except in the rare ecological systems (ex. some prairies) that were naturally devoid of large woody biomass, or where public safety requires some removal... We will only support active management that is clearly needed based on the best science, and where the current management and/or condition of the landscape have altered the natural processes of the system (roads, fields, fire suppression, etc.). Removal of large woody debris would, in most cases such as hardwoods, cedar or White/Red Pine, be the last thing we should consider doing. These systems have lost a generation of recruitment of large woody debris; no more should be taken out of them. We all need to remember that this OG/BS system is about recovering native habitat, and that large woody structures are one type of habitat that has been greatly reduced in our forests.

Managed old growth is not how we see the OG/BS system's mission. The rest of the State Forest system can



be managed to meet the needs for products and for actively managed habitat conditions. The OG/BS system should be about 100% reinvestment of biomass, a very rare attribute of ecosystems in Michigan in the last 150 years, but a very common attribute in these systems in the previous 10,000.

We would like clear language that limits active management to where it is scientifically justified, while making it clear that some active management will be needed. It does not have to be our language above but should be similarly limiting in the extraction of biomass from the system. Most of the systems needing active management would be fire driven systems, and large woody debris is not a fire hazard and is exactly what is missing in most fire systems, a legacy of large living and dead trees.

MFPC—Comments on this guideline raise a basic question that I believe the PAT has not clearly addressed. Is the focus of the OG/BS going to be species, communities and the supporting processes? If it is, management that does not impact the focal species or community could be included in the management plan for the specific reserve.

Does the DNR and PAT view the OG/BS as set-asides from active management? Are adaptive management efforts acceptable in OG/BS reserves?

## 2. Oil, Gas & Minerals

RGS--Long term goals and how a parcel fits into all designation criteria should take priority over whether an area is or may be used for mineral extraction. I would recommend removing the second paragraph or adding (If mineral extraction operations negatively impact the conservation targets for that OG/BS area).

MFPC-- The **Oil, Gas and Mineral** lease section makes sense. The existence of the lease may limit the opportunities to apply adaptive management or may some day disrupt progress made toward the desired future condition of the OG/BS designation. Modifying the terms of the lease should also be considered in addition to the "reclassification as non-leasable" option.

MAT-- My only concern here is that the leases that are current will not be in danger of being terminated until the leasee has no further use for the lease.

## 3. Microwave Towers

RGS-- [I agree that] this category should be expanded beyond microwave towers; However, I suggest eliminating all but items 1 and 2 in the narrative. These points cover the biological factors that should be used to determine the impact of such towers on OG/BS areas. While there is some evidence that migrating birds collide with towers, this is true no matter where towers are and this concern is not specific to OG/BS areas.

MFPC-- The section on **Microwave Towers** is a good model for the other listed activities. This section retains a focus on the species' needs and the original species or community goals that prompted the OG/BS designation. The specific impact on migrating birds however is not necessary.

TU-- This is too specific. It should not just be about microwave towers. We are working on a document for the future -- A future of unknowns. I believe this section should be re-written to be more general to dis-allow the construction of any non-natural (man-made) occurring structures within the limits of the designated areas.

MAT-- I do not have much of a problem with this section, except for the migrating birds statement. I see the presence of Microwave towers as having very little impact on the population of neotropical song birds.

SC-- Please note that once a parcel or portion of that parcel has been approved for OG/BS designation, the manager or other staff should seek to get the parcel reclassified as nonleasable or non-development land. [also suggested removing text referring to impact on migrating bird species-gp]

#### 4. Roads and Motorized Trails

RGS-- [My feeling is that] the OG/BS plan is attempting to designate areas based on specific biological needs. Roads and noise issues are more social considerations. These areas may be designated through other programs (such as wilderness areas). Roads should be evaluated with respect to their impact on the conservation targets.

MFPC-- ...enters into a long discussion of the additional values humans associate with old growth: “free of noise,” “solitude and wild beauty.” This seems out of place in a biological or ecological selection criteria or management strategy focused on conservation of species, communities or ecological process. There are several vegetation community types that warrant designation but would not be impacted by noise. Wording comparable to that used in the **Non-Motorized Trails** and **State Forest Campgrounds** discussion would be more appropriate.

TU-- I would like to see this section broaden, as above, to include any vehicles or devices requiring circulation ways greater in impact than natural large game trails. Also see John Johnson’s issue about “noise”.

MAT-- I like the statement on old growth not being synonymous with wilderness. I think in some cases these old growth areas will look nothing like the typical association with old growth. Again, the sound levels, and ancillary factors should be left up to the managers to determine whether these factors will affect the target species.

SC-- No new roads should be built in OG/BS designated lands.

#### 5. Non-Motorized Trails

RGS--Same as #4 (Roads should be evaluated with respect to their impact on the conservation targets)

#### 6. State Forest Campgrounds

RGS--State Forest Campgrounds should be evaluated for their ability to provide for the specific goals of the OG/BS areas. Again, the priority should be given to the biological contributions these areas can provide. If those needs can be met in areas with higher human use, they should be included. Creating buffers or corridors around highly used areas may be helpful if the area provides biological benefits that may be negatively impacted by recreational use.

#### 7. Kirtland’s Warbler Management Units

RGS--It seems that KW areas are managed already to provide for biodiversity. It is a perfect example of areas that must be intensively managed to maintain biodiversity in the State. If this plan is an OG/BS plan, KW could be included with no conflict and management would continue as it has in the past. This is an example of the need to show how OG/BS fits into our current management practices and designations.

MFPC-- If the appropriate revisions are made in the section on **Timber Harvest and Silvicultural Work** (see comments above), there would be no need to include the section on **Kirtland’s Warbler Management Units**. In fact, the Kirtland’s Warbler Management plan would serve as an example of appropriate “active management” in a designated OG/BS area.

TU--I agree with John Johnson’s previous comments, placing this into 1).

#### 8. Designated or Proposed Natural Areas

MFPC-- The sections on **Proposed Natural Areas and Adjacent Areas** seem appropriate. The note referencing “non-motorized uses of motorized vehicles” should be corrected (interesting idea) or dropped

entirely from the section. I also recommend that in the last sentence the word “integrity” be changed to “objective.” Appropriate management to protect or enhance biological “integrity” is a subjective assessment that cannot be measured and consequently will be constantly appealed.

SC--Here and in other protected areas classifications, we need to consider if OG/BS designation is needed to add protection of these areas so they help meet conservation targets. If not, then they can enhance the system, but do not need the additional protection of formal designation. In other words, if we have limited acres of OG/BS that will be designated, then priority should go to adding protection to other more threatened acres, and not to protecting the protected.

We need to differentiate between OG/BS designated lands and other lands that contribute to the system but are not officially designated. These other lands would include TNC preserves, other private lands managed for biodiversity, National Forest lands, National Wildlife Refuges, National Parks, and State owned lands already having the needed level of protection to contribute to the system but not needing the additional protection of OG/BS designation.

## **9. Areas Adjacent to or Near Natural Areas**

RGS--This section is probably unnecessary. We have commented on block size and connectivity. Examination of areas near natural areas, wilderness areas, State parks, National Forest areas, etc., make sense to provide for size and connectivity issues. This connectivity issue again relates to conservation targets. Connectivity for KW or other early successional species is different from those that use mature timber. Connectivity and the use of Natural Areas depend on the goals of that area.

## **10. Stands Identified in OI Operations Inventory (OI) as Having Special Management Area Potential (SMAP)**

## **11. Deeryards, Forest Openings and Other Areas Having High Game Management Value**

RGS--While in general I support the idea that “game” management areas should not be included in the OG/BS plan, I am not sure I agree with why. As we developed the OG/BS plan, we discussed, and are using, conservation targets to evaluate OG/BS success. Management traditionally viewed as game management accomplishes the same thing. Management to benefit specific game species also provides important habitat for a wide range of nongame species. In addition, game species are just as important as components of biodiversity as are nongame species. Perhaps the species’ goals that can be accomplished without OG/BS designation are not the priority for OG/BS. The plan does not state this well, if at all. I think that most areas with a high priority for game management should remain outside the OG/BS plan to ensure that management activities will continue, but these areas should also be evaluated for their contribution to overall biodiversity on State lands. I think the 5 sub items listed help to assess how these areas may be considered for inclusion and it will depend on the overall goals for that portion of State property as well as how the area fits into the current management regime and how the area fits into the goals of OG/BS inclusion on a site-by-site basis.

MFPC-- I think the section on exclusion of **Game Management** units is inappropriate. There may be certain conditions such as severe browse impact or intentional non-native vegetation management that would disqualify an area from inclusion. However, there are several game management areas such as state and federal waterfowl refuge areas that would be totally appropriate for inclusion or at least considered part of the OG/BS network.

TU--I feel if an existing game management area has potential to be an OG/BS area, or enhance an adjacent OG/BS area, it should be included, but removed from the management regime if incompatible with the OG/BS area it is being placed into. This would be a special case-by-case call.

## **12. Military Lands**

RGS--Military lands should receive the same consideration as other areas and go through the same process. They may be able to fit the biological needs of an OG/BS area.

TU-- If a designated parcel is internal to these military lands, special efforts should be made to educate the military towards revising their policy towards use of a specific designated area and adjacent property to allow proper protections to be maintained.

SC-- In areas where the Military lands are critical to the OG/BS design, managers should consider beginning a process to address how a designation can take place. [Across the country some Military reserves function as important habitat areas, Michigan should be no exception.]

## **13. Cultural Resources**

## **14. Utility Rights-of-Way**

## **15. Proximity to Private Lands**

MFPC-- ...there should be some consideration given to the needs of the species, species association or community of concern. Early successional forest adjacent to OG/BS may be totally appropriate or even desirable for certain species associations.

## **16. Non-Forested Wetlands**

RGS--If these areas are rare or meet specified goals, they should be included. Management needs to be an option here as on other sites. The 5 considerations listed are very similar to discussions we have had on the overall OG/BS plan. It probably does not need to be included here again.

SC-- [Non-Forested should include more than just wetlands-gp] ...savannas, prairies and other non-forested lands...coastal marshes, oak/pine savanna, emergent prairies, etc...

## **17. Natural Rivers**

TU-- As in the National Forest areas, access should be granted to allow stream restoration projects to obtain natural occurring materials for re-establishment of large woody debris structures, whole trees, etc. I feel the National Forest verbiage covers this, if it could be incorporated into the final documents.

SC-- If a NRP area is being considered for inclusion to provide connectivity and the goals and objectives of the NRP area are sufficient to meet the needs of conservation targets for connectivity, then the area may not need designation, and therefore more restricted landuse guidelines. It would function to enhance the system without further restricting management. Some NRP areas may need further management restrictions and should then be considered for designation.

## **18. Riparian Corridors, Watersheds and Aquatic Habitat Protection**

RGS--Riparian areas have value to both old growth and biodiversity. Biodiversity in riparian areas are also dependent on the full range of conditions including disturbed areas. The added values associated with riparian management do not extend only to those species that utilize mature forest communities. Many early successional species utilize early successional habitat in riparian areas -- Woodcock are a prime example. Designation of riparian areas should receive the same evaluation as upland areas. Natural Rivers areas are already set aside as receiving special consideration, there is no need to give riparian areas yet another level of priority for designation. If the OG/BS plan sets out to maintain biodiversity through selecting specific

conservation targets and meeting those goals, the selection of riparian areas will be accomplished by way of the specific needs of those targets.

TU-- As in 18 [17-gp] above.

### **19. The Natural Rivers Program**

RGS--Same category as 17, remove.

SC--remove

## GLOSSARY - SUB-APPENDIX A

**Natural** – not a static or discrete concept, doesn't preclude human activities in native systems, but it does emphasize a degree to which native systems function without regular human intervention (originally from TNC).

**Functional** – The ability of an OGBS area to maintain healthy, viable species, community or ecological systems, the conservation targets, over the long term (100+ years), including the ability to respond to natural or human-caused environmental change. (*Based on "function" — natural or proper action for which an organism or habitat or behavior has evolved*)

**Biodiversity Stewardship** – Management that protects, conserves, restores or mimics natural patterns, structure, species composition and processes within or among ecosystems in an area.

**Native ecosystems** – LTAs or other ecological units (such as ELU's) within an eco-regional subsection or sub-subsection, characterized by terrestrial and aquatic ecological systems within their natural range of variability.

**Native** - Those species and communities that were not introduced accidentally or purposefully by people but that are found naturally in an area. Native communities are those characterized by native species and maintained by natural processes. Native includes both endemic and indigenous species.  
(Designing a Geography of Hope, TNC)

**Natural range of variability** – The amount of fluctuation expected under minimal or no influence from human activities over time frames relevant to conservation planning and management (years to millennia).  
(Designing a Geography of Hope, TNC)

Note: this definition is intended as a sideboard for conservation target ranges, it is not intended to exclude human activities as a natural part of ecosystems.

**LTA (Landtype associations)** - are an intermediate level in the national hierarchy of ecoregional land classification. LTAs are delineated based upon similarities in glacial landform, gross soil texture and drainage classes, and natural overstory vegetation types. (Corner, Albert 1998).

**ELU (Ecological Land Unit)** - Similar to LTA, but defined mostly using broad scale information. ELU's are derived using readily available digital spatial data sets such as digital elevation models, surficial geology, and hydrography and are defined as combinations of several environmental variables. Biophysical or environmental analyses such as (ELUs) combined with land cover types and satellite imagery can be useful tools for predicting locations of communities or ecological systems when such information is lacking, and capturing ecological variation based upon environmental factors. (Designing a Geography of Hope, TNC)

**Representation** - A principle of reserve selection and design referring to the capture of the full spectrum of biological and environmental variation within a network of reserves or conservation sites, including all genotypes, species, communities, ecosystems, habitats, and landscapes. Goals for representation (number per subsection) are set based on the spatial scale (matrix, large patch, or small patch) and geographic distribution (endemic/restricted, limited, or widespread). (Designing a Geography of Hope, TNC) (See appendix A for more details)

**Distribution** – The geographic range of occurrence of a community or ecological system relative to an ecoregion or subsection. To set a goal for how many examples of each conservation target, group communities and systems into categories based on their relative endemism to the ecoregion:

**Restricted/endemic:** occurs primarily in one ecoregion or subsection.

**Limited:** occurs in the ecoregion and a few other adjacent ecoregions.

**Widespread:** widely distributed in several to many ecoregions.

**Spatial Pattern** – The distribution and extent of landscape features. See below for examples of spatial patterns used in this document.

**Matrix-forming or matrix communities** - Communities that form extensive and contiguous cover may be categorized as matrix (or matrix-forming) community types. Matrix communities occur on the most extensive landforms and typically have wide ecological tolerances. They may be characterized by a complex mosaic of successional stages resulting from characteristic disturbance processes (e.g. northern hardwood-conifer forests). Individual occurrences of the matrix type typically range in size from 2000 to 500,000 hectares (4,942 to 1,235,000 acres). In a typical ecoregion, the aggregate of all matrix communities covers, or historically covered, as much as 75-80% of the natural vegetation of the ecoregion. Matrix community types are often influenced by large-scale processes (e.g. climate patterns, fire) and are important habitat for wide-ranging or large area dependent fauna, such as large herbivores or birds.

(Designing a Geography of Hope, TNC)

**Patch community** - Communities nested within matrix communities and maintained primarily by specific environmental features rather than disturbance processes. (Designing a Geography of Hope, TNC)

**Large patch:** Communities that form large areas of interrupted cover. Individual occurrences of this community patch type typically range in size from 50 to 2,000 hectares (124 to 4,942 acres). Large patch communities are associated with environmental conditions that are more specific than those of matrix communities, and that are less common or less extensive in the landscape. Like matrix communities, large-scale processes also influence large-patch communities, but these tend to be modified by specific site features that influence the community. (Designing a Geography of Hope, TNC)

**Small Patch** - Communities that form small, discrete areas of vegetation cover. Individual occurrences of this community type typically range in size from 1 to 50 hectares (2.5 to 124 acres). Small patch communities occur in very specific ecological settings, such as on specialized landform types or in unusual microhabitats. The specialized conditions of small patch communities, however, are often dependent on the maintenance of ecological processes in the surrounding matrix and large patch communities. In many ecoregions, small patch communities contain a disproportionately large percentage of the total flora, and also support a specific and restricted set of associated fauna (e.g. invertebrates or herptofauna) dependent on specialized conditions.

(Designing a Geography of Hope, TNC)

**Conservation Targets (targets)** - An element of biodiversity selected as a focus for conservation planning or action. The three principle types of targets for planning projects are species, ecological communities, and ecological systems.

(Designing a Geography of Hope, TNC) (See Appendix A for more details)

**Connectivity** - Conservation sites or reserves have permeable boundaries and thus are subject to inflows and outflows from the surrounding landscapes. Connectivity in the selection and design of nature reserves relates to the ability of species to move across the landscape to meet basic habitat requirements. Natural connecting features within the ecoregion may include river channels, riparian corridors, ridge-lines, or migratory pathways. (Designing a Geography of Hope, TNC)

**Shifting Mosaic** - An interconnected patchwork of distinct vegetation types that may shift across the land surface as a result of dynamic ecosystem processes, such as periodic wildfire or flooding. (Designing a Geography of Hope, TNC)

**Energy Capture** - From photosynthesis to predation, the ability of target species to meet their needs for food (energy), in all seasons of the year.

**Dispersal-dominated species populations** - Species for which there are suitable habitat patches to support small populations, but the patches are beyond the distance over which individuals can move, or are separated by a matrix that is too hostile to permit movement. (Lambeck, 97)

**Area-limited species** - Species for which the patches of appropriate habitat are simply too small to support a breeding pair, or, in the case of colonial species, a functional social group. Area-limited species are also resource-limited, but they should be considered in this category if the limiting resource is not obvious or quantifiable. Habitat patches are therefore used as a surrogate for resources, and it is assumed that there is a minimum patch size of a given quality that will provide sufficient resources to support a pair or group (Lambeck, 97)



## BIBLIOGRAPHY – SUB-APPENDIX A

Corner, Richard A./ Albert, Dennis A. MNFI (1998), Landtype Associations of the High Plains Subsection VII.2.

Lambeck, Robert (1997) Focal Species: A Multi-Species Umbrella for Nature Conservation Conservation Biology 11(4) (August 1997) 849-856 (7 pages).

Minnesota Department of Natural Resources. 2000. Landtype Associations of the Lake States. 23pp.

**Available at:** <http://www.conserveonline.org>

Guidelines for Representing Ecological Communities in Ecoregional Conservation Plans

Edited by Craig Groves and Laura Valutis

Designed by Nicole S. Rousmaniere

Copyright 1999 The Nature Conservancy

ISBN: 0-9624590-3-8

ecguide.pdf

Designing a Geography of Hope: A Practitioner's Handbook for Ecoregional Conservation Planning, © 2000 by The Nature Conservancy Volume 1 and 2

*Ecological Processes at the-Ecoregional Scale-Update5b.doc*

Ecological Processes at the Ecoregional Scale:

Considerations for Portfolio Design

Guidelines for Ecoregional Team Leaders

from the Stewardship Expert Team

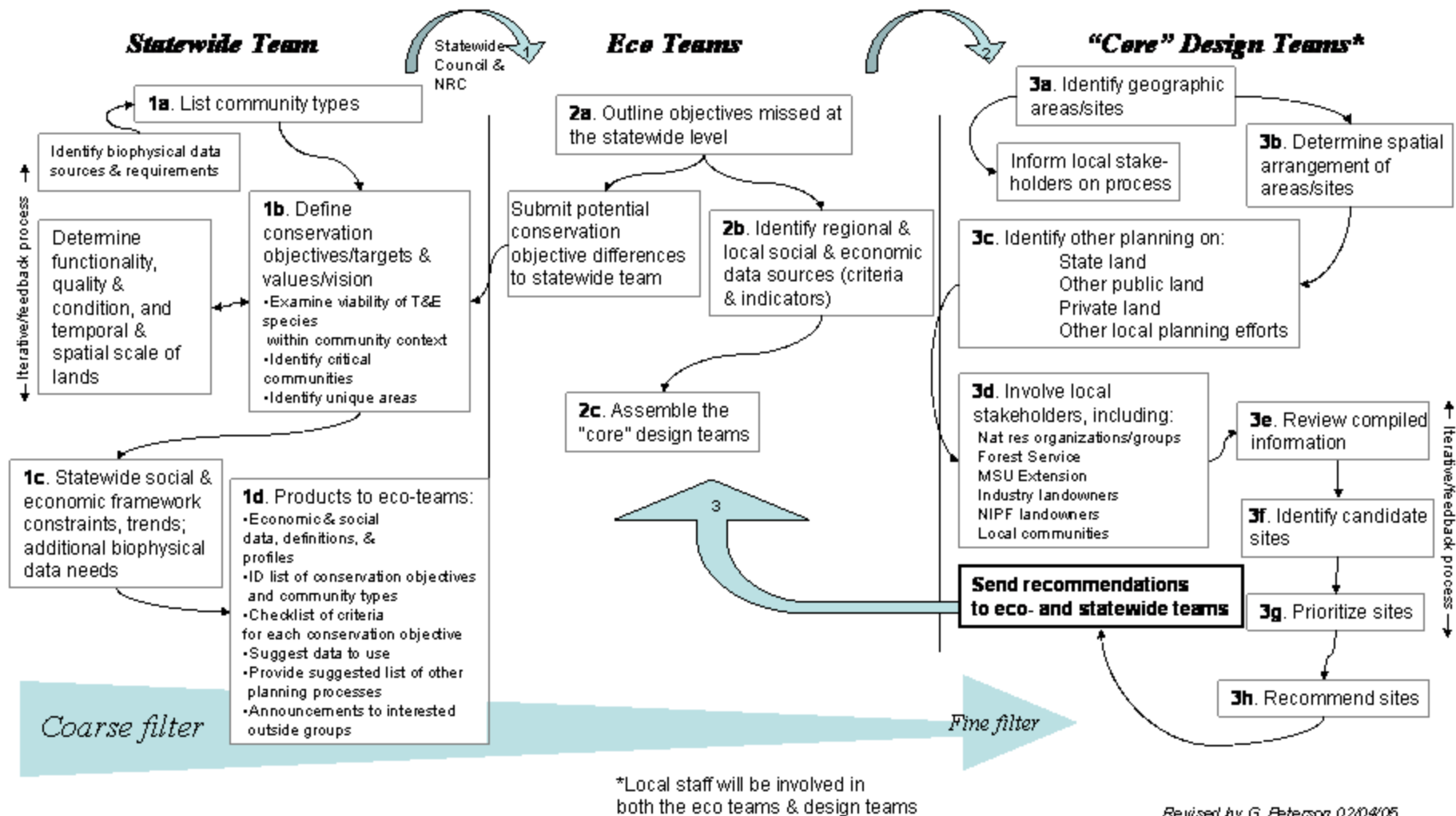
Draft Date: August 1998

*Functional Landscapes.pdf*

FUNCTIONAL LANDSCAPES

and the Conservation of Biodiversity

Conservation Area Management Guidance  
**BIODIVERSITY CONSERVATION PLANNING PROCESS**  
**SUB-APPENDIX B**



Approved by Statewide Council April 2005  
 Revisions pending

## SUB-APPENDIX C

### Biodiversity Stewardship Internal Working Group

#### Property selection steps

*Last Modified: 2/04/05 by G. Peterson*

These written steps are designed to accommodate the corresponding flow chart that describes the proposed selection process for Biodiversity Conservation lands.

Flow chart box #	Description																		
1a	<p><u>List community types</u>            For each of the 70 natural community types identified and described by MNFI, identify the general distribution and quantity of each community type exists now and in the past. Define any variation in each community type.            (Datasets needed: MNFI, FIA (IFMAP for state forests), Landsat, Natureserve[TNC] for federal lands)</p> <p><u>Sidebar: Identify biophysical data sources &amp; requirements</u>            Provide sources and directions on how to use these data sources:</p> <table> <tr> <td>MNFI</td><td>Need:</td></tr> <tr> <td>IFMAP (OI)</td><td>Survey of MNFI</td></tr> <tr> <td>GLO</td><td>Layer 4 IFMAP (high res cover)</td></tr> <tr> <td>Community abstracts</td><td>Private lands—FIA</td></tr> <tr> <td>LTA'S</td><td>Private lands—aerial photos</td></tr> <tr> <td>Land ownership (GAP)</td><td></td></tr> <tr> <td>USFS inventory</td><td></td></tr> <tr> <td>Kotar (predictive)</td><td></td></tr> <tr> <td>Forest health databases</td><td></td></tr> </table>	MNFI	Need:	IFMAP (OI)	Survey of MNFI	GLO	Layer 4 IFMAP (high res cover)	Community abstracts	Private lands—FIA	LTA'S	Private lands—aerial photos	Land ownership (GAP)		USFS inventory		Kotar (predictive)		Forest health databases	
MNFI	Need:																		
IFMAP (OI)	Survey of MNFI																		
GLO	Layer 4 IFMAP (high res cover)																		
Community abstracts	Private lands—FIA																		
LTA'S	Private lands—aerial photos																		
Land ownership (GAP)																			
USFS inventory																			
Kotar (predictive)																			
Forest health databases																			
1b	<p><u>Define conservation objectives, targets &amp; values for each community type</u>            How unique is the specified community type in the state? The country? The world?            How threatened is the community type (statewide land use reports, development pressures, pollution/ environmental damage, potential exotic pest impacts, etc)?            What threatened &amp; endangered species does the community type support? (Datasets needed: MNFI, MIWILD)            What aspects of the community type <i>should</i> be restored, maintained, expanded, or reestablished? (Datasets needed/info needed: MNFI, TNC, USFS, PAT)            What aspects of the community type <i>can</i> be restored, maintained, expanded, or reestablished?            Note: Statewide team must be able to justify direction to ecoteams and others.</p> <p><u>Sidebar: Determine functionality, quality &amp; condition, and temporal &amp; spatial scale of lands</u>            What are the successional stages necessary to functionally maintain the system?            Are these stages currently represented across the landscape?            For each community type, define relative importance of the ecological criteria defined by the Public Advisory Team (e.g. how important are landscape context, block size and connectivity to maintain the conservation objectives in a particular community type?) Use LTAs at the sub-sub section level for widespread community types, may need to use other spatial sources for less common types.            Identify other statewide landowners who may be representing the system.</p>																		

Flow chart box #	Description
1c	<p><u>Identify statewide social &amp; economic trends and constraints</u>  <u>AND identify additional biophysical data needs</u>  Population: density, seasonal homes, change, proximity to state land.  Employment and earnings: forest products, tourism and recreation, hunting and fishing, mineral, oil and gas, watersheds, special/nontimber forest products.  Areas that are protected under other designations</p> <ol style="list-style-type: none"> <li>i. Conservation easements</li> <li>ii. TNC</li> <li>iii. Natural Rivers</li> <li>iv. Wilderness</li> <li>v. Trail systems</li> <li>vi. Scenic corridors</li> <li>vii. UM BIO Station</li> <li>viii. Other DNR ownerships</li> <li>ix. Proposed natural areas list</li> </ol> <p>Other forest uses generated locally</p>
1d	<p><u>Provide the following products to eco-teams:</u>  List of conservation objectives associated with each community type  Checklist of ecological criteria important for each conservation objective  Relevant economic &amp; social data, definitions and profiles  Relevant biophysical data  Suggested list of other planning processes to connect with  Announcements to interested outside groups</p>

Opportunities for public participation at the statewide level:

- Establish/maintain web page in “Forests, Land & Water” section of DNR website that lists the history, timeline, supporting documentation and latest happenings. Provide on-line connection to offer comments on the process, including a running summary of all comments for on-line visitors to view.
- Maintain electronic listserv that also provides opportunities for on-line comments, announcements and discussions.
- Update list of organizations and agencies (statewide, regional, and local) who are potentially interested in the Biodiversity Conservation process. Provide executive summary and future intentions to these groups.
- Develop “canned” presentation of Biodiversity Conservation process that can be offered at organizational and agency functions.
- Discuss products from “1d” above with Public Advisory Team.

Flow chart box #	Description
2a	<u>Outline objectives missed at the statewide level</u> Locally identify conservation objectives: How unique is the specified community type in the region? What aspects of the community type <i>should</i> be restored, maintained, expanded, or reestablished? What aspects of the community type <i>can</i> be restored, maintained, expanded, or reestablished? How threatened is the community type (statewide land use reports, development pressures, pollution/ environmental damage, potential exotic pest impacts, etc)? What Threatened & Endangered species does the community type support? Compare locally identified objectives to state-identified objectives for the community type <u>Sidebar: Submit additional local conservation objectives to statewide team</u>
2b	Identify regional and local social & economic data sources Use local social & economic data that augments statewide data to examine local constraints on site selection. Identify criteria & indicators using statewide and local data sources. Resolve any statewide-local conflicts, if any, before proceeding.
2c	<u>Assemble the “core” design teams</u> Identify appropriate number of core design teams within each eco-team (suggested number: 1) Identify local & eco-team staff who will serve on core design teams.

Opportunities for public participation at the eco-team level:

Because the Biodiversity Conservation process is so complex, the eco-team level of public participation could serve as the “education & outreach” level. Efforts can be made to share ecosystem-based concepts and the overall Biodiversity Conservation process with individuals and groups, so that they may make informed contributions at the design team level.

- Update and maintain list of regional organizations and individuals who are interested in the Biodiversity Stewardship process.
- Use regional, modified version of “canned” presentation to deliver to local or regional organizational events.
- Include findings, changes, and recommended Biodiversity sites in compartment reviews and open houses.

Flow chart box #	Description
<b>3a</b>	<u>Identify geographic areas/sites</u> Locally identify location of target community types Classify those community type locations according to specified conservation objectives Sidebar: Inform local stakeholders on the process: DNR, DEQ, USFS, TNC, NRCS, other partners (relatively small group)
<b>3b</b>	<u>Determine spatial arrangement of areas/sites</u> Do the targeted areas meet functionality, quality & condition, and temporal & spatial scale requirements?
<b>3c</b>	<u>Identify other planning on state, other public, and private lands</u> Consider how other planning processes in the local area affect, or are affected by, the Biodiversity Conservation selection process for the community type
<b>3d</b>	<u>Include local stakeholders</u> Identify interested and/or potentially affected local and statewide parties, including: Natural resource organizations/groups U.S. Forest Service MSU Extension Industry landowners NIPF landowners Local community leaders
<b>3e</b>	<u>Review compiled information</u> Examine data, maps, etc from local, regional and statewide processes
<b>3f</b>	<u>Identify candidate sites</u> List the sites that meet the agreed-upon criteria using: PAT criteria recommendations Local data and constraints
<b>3g</b>	<u>Prioritize sites</u> Use local design teams to prioritize sites outlined in 3f
<b>3h</b>	<u>Recommend sites</u> Recommend selected area locations and acreages to eco- and statewide teams Include recommended management activities to improve or maintain these sites in the specified quality and condition

#### Opportunities for public participation at the design team level:

- Use list of interested parties (compiled by eco-teams) to identify participants for local design teams. Members of the design team should have a basic familiarity with the local area. Strive to maintain a balance of the varying interests. If applicable, use guidelines set for the state-level Public Advisory Team as a model.

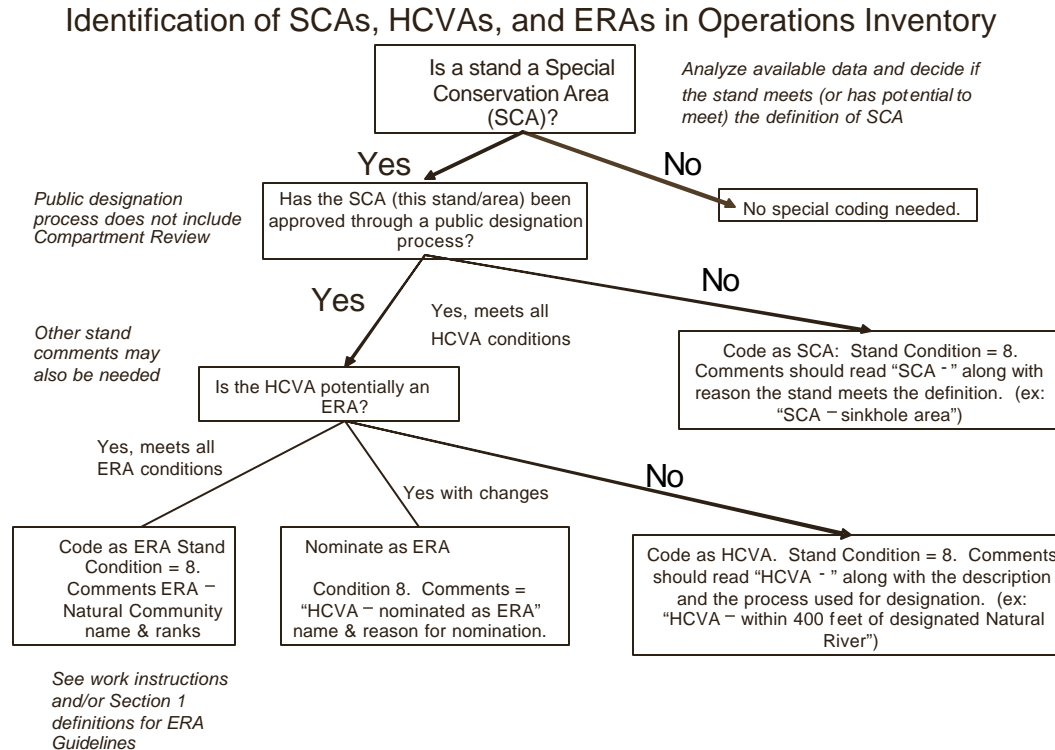
#### Other notes/thoughts

- Statewide team will help ecoteams in setting limits. For example, although this was a huge ecological system at one time, we are not trying to re-create that.
- Need to realize this process will change over time. Different matrix 50-100 years into the future.

## APPENDIX B: CONSERVATION AREA CODING

**Work through the flowchart in the work instructions, (figure 2 – also shown below), examiners need to determine the proper coding for the comments. It is important to make the comments “searchable” – so that the conservation areas can be found in the database.**

Figure 2.



**To make the comments searchable, standard abbreviations and coding need to be used. The table on the next page covers the different categories of conservation areas, examples of each, and the coding needed:**

Category = ERA, HCVA, SCA

					Direction to the stand examiner (Where information can it be found)
Category	Class and name	Abbrev.	Mechanism of Dedication	Naming Protocol	
ERA	Natural Community Name and Global/State Rank and EO Rank (site specific)		Initial - 116 known locations. Future - Biodiversity Process	<b>ERA - NC-</b> <Name><Ranks><Comment>	All will be available and shown as ERA's on intranet or CD
<i>Example</i>		<b>NC</b>	<i>MNFI database</i>	<i>ERA-Alvar- S1/G2 EO Rank AB</i>	<i>Additional comments may be necessary/useful as well in all cases</i>
HCVA	Name and mechanism of dedication			HCVA <Descriptor><Comments>	All will be available and shown as HCVA's on intranet or CD
	<b>Critical Dunes</b>	<b>CD</b>		<b>CD &lt;name&gt;</b>	
<i>example</i>	<i>Nordhouse Dunes</i>		<i>Legislation</i>	<i>HCVA - CD – Nordhouse Dunes</i>	
	<b>Species Recovery Plans</b>	<b>SR</b>			
<i>example</i>	<i>Kirtland's Warbler</i>			<i>HCVA - SR - Kirtland's Warbler - comments</i>	
	<b>State Natural Areas (legally dedicated)</b>	<b>SNA</b>		<b>SNA &lt;name&gt;</b>	
<i>example</i>	<i>Little Brevort Lake</i>		<i>Legislation</i>	<i>HCVA - NWW – Little Brevort Lake</i>	
	Natural Rivers	<b>NR</b>		<b>NR &lt;name&gt;</b>	
<i>example</i>			<i>Legislation, dedication process</i>	<i>HCVA - NR - Manistee</i>	
	<b>Dedicated Management</b>			<b>DM &lt;name&gt;&lt;mechanism of dedication&gt;</b>	
<i>example</i>	<i>Sand Lakes</i>	<b>DM</b>	<i>Director's Order-LUOD</i>	<i>HCVA - DM - Sand Lakes Quiet Area - Director's order</i>	
	<b>Environmental Areas</b>	<b>EA</b>	<b>Legislation via DEQ</b>	<b>HCVA EA (name)</b>	<b>DEQ database</b>
SCA	SCA <Descriptor><Comments>				Comes from analysis, public input, administrative agreement, MOUs, land use orders, statute.....
	State Natural Area	<b>SNA</b>	Proposed for legal designation	SCA – SNA - name - proposed for legal designation	
	State Natural Area	<b>SNA</b>	Nominated for legal designation	SCA - SNA - name - nominated for legal designation	



	State Natural Area	<b>SNA</b>	Administratively recognized	SCA - SNA - name - administratively recognized	NOTE: if sensitive, instead of species name put "see locked comments" - then put it there.
	State Natural Area	<b>SNA</b>	dedicated by NRC resolution	SCA - SNA - name - dedicated by NRC resolution	
	National Natural Landmark	<b>NNL</b>	MOU with federal program	SCA - NNL - (name)	
	Species recovery plan or guidelines	<b>SR</b>	Michigan Bird Conservation Initiative	SCA - SR - species name - MI Bird Conservation Strategy	
		<b>SR</b>	Wildlife Conservation Strategy		
		<b>SR</b>	Compartment Review		
<i>example</i>	<i>Pitcher's Thistle</i>	<b>SR</b>	<i>federal recommended recovery plan</i>	SCA - SR – <i>Pitcher's thistle</i>	
<i>example</i>	<i>Karner Blue Butterfly</i>	<b>SR</b>	<i>critical habitat plan</i>	SCA - SR - <i>Karner Blue Butterfly</i> - comments	
	Potential Old Growth	<b>POG</b>	Pre 2008 designation and reason	SCA - POG - <specific objective> SCA - POG - <i>developing hemlock understory</i>	
<i>example</i>	Sensitive Information (T&E, Archeological sites, cultural Headwaters	<b>SI</b> <b>HW</b>	See Locked comments	SCA - SI - see locked comments SCA - HW - name	
	Trout stream or lake	<b>Trout</b>	Land adjacent to designated trout stream or lake	SCA – Trout-- comments	

## **APPENDIX C: NATURAL COMMUNITIES MANAGEMENT (WORK IN PROGRESS)**

## APPENDIX D: NATURAL AREAS

### Natural Areas Strategic Plan

With only a very small portion of Michigan's original landscape remaining, it is integral to the mission of the Michigan Department of Natural Resources (DNR) to protect representative examples of the native ecosystems and unique natural features that remain. Natural Areas<sup>6</sup> are recognized internationally as an important tool for managing ecosystems, associated natural resources, and safeguarding our natural heritage. In Michigan, it is the role of the Natural Areas Program to coordinate the identification, protection, management and administration of natural areas. The Natural Areas Program has identified 78 State Natural Areas covering approximately 127,000 acres. Of these there are 20 legally dedicated areas totaling 48,081 acres. These areas, together with the many natural areas managed by other public and private organizations and individuals, make up a statewide "system" of natural areas.

The DNR Management Team approved the Natural Areas Program Strategic Plan in 2000. The plan is available by accessing the DNR website [http://www.michigan.gov/dnr/0,1607,7-153-30301\\_31154\\_31260-33689--,00.html](http://www.michigan.gov/dnr/0,1607,7-153-30301_31154_31260-33689--,00.html) and the DNR Forest Certification Website.

### State Natural Areas Management

The Natural Areas Program is administered by Wildlife Division's Natural Heritage Unit. Questions regarding Natural Areas management, administration, appropriate activities and other concerns should be directed to the Natural Heritage Unit Supervisor.

There have been a variety of mechanisms used to identify Natural Areas. Any of these may be encountered on state forest land. (Additional information is provided in Section A. Natural Area Definitions and Section B. Natural Areas Table in the document below).

Prior to 1972 the Natural Resource Commission dedicated lands using six (6) categories: Managed Tract, Natural Area Preserve, Nature Reservation, Nature Study Area, Nature Study Preserve and Scenic Site. Each type of area is managed in accordance with its stated purpose.

Since 1972 Natural Areas have been identified using three (3) categories: Natural Area, Wild Area, and Wilderness Area. Within these categories there are seven (7) types of designations. Table 1 lists the areas and designations.

---

<sup>6</sup> The term "natural area" refers to Wilderness, Wild and Natural Areas described in Part 351 Natural Resource and Environmental Protection Act 451, 1994 as amended.

Table 1: DNR State Natural Areas Designations

State Natural Area	Type of Designation	Effect (strength) of designation	Reference:
Natural Area  Wild Area  Wilderness Area	Legally Dedicated (LD)	Force of law	Part 351 PA 451 See Specific Administrative Rule
	Proposed for Legal Dedication (PLD)	Force of law	Part 351 PA 451
	Nominated for Legal Dedication (NLD)	Administrative Direction	Part 351 PA 451
	Dedicated by Natural Resource Commission Resolution: (NRC) Managed Tract Natural Area Preserve Nature Reservation Nature Study Area Nature Study Preserve Scenic Site.	Administrative Direction	See Specific NRC Resolution
	Administratively Recognized (AR)	Administrative Direction	See specific plan
	The Nature Conservancy Natural Areas Registry Site (TNC)	Cooperative Agreement	See specific agreement
	National Natural Landmark (NNL)	Cooperative Agreement	See specific agreement

Guidance:

1. All State Natural Areas will be managed according to their identified purpose.
2. Management and recreation activities will be conducted in accordance with the controlling legislation and/or management agreements and will not adversely impact identified values.
3. Activities that may detract from the site's potential or from the identified values will be discussed with the Natural Heritage Unit Supervisor and be documented.
4. If the site is no longer suitable for inclusion in the Natural Areas designation contact the Natural Heritage Unit Supervisor for further direction.
5. Actions necessary or undertaken for immediate human health and safety or resource health will be documented through the chain of command and the Natural Heritage Unit Supervisor advised.
6. Additional information on State Natural Areas identification, protection, management and monitoring is located on the DNR Forest Certification Web Site (from 2002 training).

## Section A. Natural Area Definitions

*The strongest form of protection, whether on publicly or privately owned land, is **legal dedication or designation**. This is because it requires legislative action to revise the protection. Areas designated by the Michigan Natural Resources Commission are protected through **Departmental policies**, and require a formal policy change to be modified. **Management plans** on public lands (parks, forests, game areas, etc.) that incorporate a natural area designation are created through a formal planning process, including a public review. Management plans can only be modified by a planning change that includes public notification. **Cooperative agreements** only require notification of the parties involved to revise protection.*

## Michigan Wilderness and Natural Areas Legislation, 1994, P.A. 451, Part 351

*These are the strongest forms of state protection, requiring a **legal dedication** process.*

### Natural Area

A tract of land or water which has the following characteristics:

- Has retained or reestablished its natural character, or has unusual flora and fauna or biotic, geologic, scenic, or other similar features of educational or scientific value, but **it need not be undisturbed**.
- Has been identified and verified through research and study by qualified observers.
- May be coextensive with or part of a wilderness area or wild area.
- Does not have any minimum or maximum area requirement.

### Wild Area

A tract of **undeveloped** land or water which has the following characteristics:

- Is less than 3,000 acres of state land.
- Has outstanding opportunities for personal exploration, challenge, or contact with natural features of the landscape and its biological community.
- Possesses 1 or more of the characteristics of a wilderness area.

### Wilderness Area

A tract of **undeveloped** land or water which has the following characteristics:

- Has 3,000 or more acres of state land or is an island of any size.
- Generally appears to have been affected primarily by forces of nature with the imprint of the work of humans substantially unnoticeable.
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation.
- Contains ecological, geological, or other features of scientific, scenic, or natural history value.

### Proposed Natural/Wild/Wilderness Area

Any area which has been “proposed for dedication” is protected under the act, and must be managed as a natural/wild/wilderness area until the dedication is final. An area is considered “proposed for dedication” when the area nomination has been approved by either:

- The Wilderness and Natural Areas Advisory Board, or
- The Director of the Department of Natural Resources

### Federal Wilderness Area, derived from the Federal Wilderness Act

*This is one of the strongest forms of federal protection, requiring a **legal designation** process.*

An area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which:

- Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable.
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation.
- Has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition.
- May also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

### Research Natural Area, defined by the USDA Forest Service

*This is one of the strongest forms of federal protection, requiring a **legal designation** process.*

An area within a National Forest that the Forest Service has designated to be permanently protected and maintained in natural condition. These protected natural areas include:

- unique ecosystems or ecological features
- rare or sensitive species of plants and animals and their habitat
- high-quality examples of widespread ecosystems

### **The Nature Conservancy Natural Areas Registry Sites**

*These are **cooperative agreements** between the Michigan Department of Natural Resources and The Nature Conservancy.*

An identified critical area in which the Department of Natural Resources (DNR) has recognized the need to manage in a manner which will protect, preserve, and perpetuate the elements of the area. The DNR has agreed to manage these areas in a manner that will sustain and foster the continued protection of the elements in voluntary preservation through cooperation with The Nature Conservancy.

### **National Natural Landmark, defined by the National Parks Service**

*These are **cooperative agreements** between the National Parks Service and the public or private landowner on whose property the area occurs.*

A National Natural Landmark is a nationally significant natural area that has been designated by the Secretary of the Interior. To be nationally significant, a site must be one of the best examples of a type of biotic community or geologic feature in its physiographic province. Examples of this natural diversity include terrestrial and aquatic ecosystems, features, exposures, and land forms that record active geologic processes as well as fossil evidence of biological evolution. The goal of the National Natural Landmarks Program is to identify, recognize, and encourage the protection of sites containing the best examples of geological and ecological components of the nation's landscape.

### **Area types defined by the Michigan Natural Resources Commission:**

*These areas were **dedicated** by the Michigan Natural Resources Commission prior to 1972.*

- **Managed Tract**

An area of land in which specific desired habitats are maintained or established by artificially regulating or manipulating the conditions which control the environment.

- **Natural Area Preserve**

An area of land having distinctive natural characteristics, dedicated to the preservation of natural conditions for lasting public enjoyment and educational benefits.

- **Nature Reservation**

An area of land having distinctive natural features set aside for maximum preservation of natural conditions consistent with the development and use of facilities for the enjoyment of nature and extensive types of recreation, and for the proper operation of the administrative unit.

- **Nature Study Area**

An area of land having special significance in natural history, dedicated for the preservation of natural conditions in combination with the development and use of facilities for conservation education, the study and enjoyment of nature, and/or research in the fields of conservation and natural science.

- **Nature Study Preserve**

An area of land having special significance in natural history dedicated for the development and use of facilities for conservation education, the study and enjoyment of nature, and/or research in the fields of conservation and natural science.

- **Scenic Site**

An area of land having unusual scenic values, dedicated for the preservation and enjoyment of natural beauty.

## Section B. Natural Areas Tables

Listed below in Tables 2 & 3 are the Michigan Department of Natural Resources, State Natural Areas by Management Unit and Division/Bureau. Note that many areas have multiple designations. You may also refer to the DNR Natural Area GIS Layer for boundaries and maps.

### Key:

FMFM: Forest, Mineral and Fire Management Division

PRB: Parks and Recreation Bureau

WLD: Wildlife Division

FMU: Forest Management Unit

LD: Legally Dedicated

PLD: Proposed for Legal Dedication

NLD: Nominated for Legal Dedication

NRC: Dedicated by NRC Resolution

AR: Administratively Recognized

TNC: TNC Natural Areas Registry Sites

NNL: National Natural Landmarks

**TABLE 2: State Natural Areas within State Forest Management Units**

Division	Management Unit	Site Name	Recognition
FMFM	Atlanta FMU	Besser Natural Area	LD
FMFM	Atlanta FMU	Duck-Mud Lake Chain Site	TNC
FMFM	Atlanta FMU	Lake Sixteen	TNC
FMFM	Cadillac FMU/ Roscommon FMU	Dead Stream Swamp	NNL
FMFM	Escanaba FMU	Shakey Lakes	AR
FMFM	Gaylord FMU	Bois Blanc Island - Mixed Forest Natural Area	LD
FMFM	Gaylord FMU	Bois Blanc Island - Northshore Natural Area	LD
FMFM	Gaylord FMU	Bois Blanc Island - Snake Island/Mud Lake Natural Area	LD
			TNC
FMFM	Gaylord FMU	Jordan River Natural Area	NLD
FMFM	Gaylord FMU /Beaver Island St.	McFadden Point	TNC
WLD	Wildlife Research Area		
FMFM	Gaylord FMU/ Beaver Island St.	Hog Island Wilderness Area	NLD
WLD	Wildlife Research Area		
FMFM	Gaylord FMU/ Wilderness St. Park	Wilderness State Park Wilderness Area	PLD
			NRC
FMFM	Gaylord FMU/Beaver Island St.	French Bay	TNC
WLD	Wildlife Research Area		
FMFM	Gaylord FMU/Beaver Island	High Island Wilderness Area	NLD
WLD	St.Wildlife Research Area		TNC
FMFM	Grayling FMU	Crawford Red Pines Site	TNC

FMFM	Grayling FMU/Private (375 acres)	South Branch of the Au Sable River Area	NRC
FMFM	Gwinn FMU	Little Presque Isle Natural Area	NLD
			AR
FMFM	Gwinn FMU	Little Presque Isle Wilderness Area	NLD
			AR
FMFM	Gwinn FMU	Rocking Chair Lakes Natural Area	PLD
			AR
FMFM	Newberry FMU	Crisp Point	TNC
FMFM	Newberry FMU	Deer Park Site	TNC
FMFM	Newberry FMU	Marsh Lakes	TNC
FMFM	Newberry FMU	McMahon Lake Strangmoor	TNC
FMFM	Newberry FMU	Vermilion Point	TNC
FMFM	Pigeon River Country FMU	Pigeon River State Forest - Dog Lake Wild Area	NLD
FMFM	Pigeon River Country FMU	Pigeon River State Forest - Grindstone Creek	NLD
		Wild Area	
FMFM	Pigeon River Country FMU	Pigeon River State Forest - Pine Tract Natural	NLD
		Area	
FMFM	Roscommon FMU	Roscommon Red Pines Nature Study Area	LD
		(Natural Area)	NNL
FMFM	Sault St. Marie FMU	Crow River Mouth	TNC
			AR
FMFM	Sault Ste. Marie FMU	Little Brevort Lake Scenic Site (Natural Area)	LD
FMFM	Sault Ste. Marie FMU	Maxton Plains Natural Area	NLD
			2-TNC
FMFM	Sault Ste. Marie FMU	Seiner's Point Wild Area	PLD
			TNC
			AR
FMFM	Shingleton FMU	Point Detour	TNC

**TABLE 3: State Natural Areas on Lands other than State Forests Managed by Parks and Recreation Bureau (PRB), Wildlife Division (WLD) or Township (TWP).**

Division Bureau	Management Unit	Site Name	Recogn- ition
PRB	Algonac St. Park	Algonac Prairie & Savanna Natural Area	NLD
			6-NRC
PRB	Bald Mt. Recreation. Area	Bald Mountain Recreation Area - Chamberlain Lakes	AR
PRB	Bald Mt. Recreation. Area	Bald Mountain Recreation Area - Graham Lake Zone	AR
PRB	Bald Mt. Recreation. Area	Bald Mountain Recreation Area - South Unit	AR
PRB	Bay City St. Recreation. Area	Tobico Marsh	NRC
			TNC
			NNL
PRB	Fort Custer Recreation. Area	Fort Custer Recreation Area - Eagle River Tract	AR
PRB	Fort Custer Recreation. Area	Fort Custer Recreation Area - River Swamp	AR
PRB	Fort Wilkins State Historic Park	Fort Wilkins State Park Site	TNC
PRB	Highland Recreation. Area	Haven Hill Natural Area	LD
			NNL
PRB	Island Lake Recreation. Area	Island Lake Recreation Area Site	TNC
PRB	Lake Superior St. Forest	Tahquamenon Island	TNC
PRB	Laughing Whitefish Falls	Laughing Whitefish Falls Scenic Site (Natural Area)	LD
	Scenic Site		



Division Bureau	Management Unit	Site Name	Recognition
PRB	Leelanau St. Park	Cathead Bay	TNC AR
PRB	Ludington St. Park	Ludington Dunes Natural Area	PLD TNC
PRB	Muskegon St. Park	Muskegon Dunes & Swales	TNC
PRB	P.J. Hoffmaster St. Park	Hoffmaster Wild Area	LD
PRB	Porcupine Mountains Wilderness St. Park	Porcupine Mountains Wilderness Area	LD NNL
PRB	Porcupine Mountains Wilderness St. Park	Presque Isle River Scenic Site (Natural Area)	LD
PRB	Porcupine Mountains Wilderness St. Park	Union Springs Scenic Site (Natural Area)	LD
PRB	Proud Lake Recreation. Area	Proud Lake Nature Study Area (Natural Area)	LD
PRB	Saugatuck Dunes St. Park	Saugatuck Dunes Natural Area	LD
PRB	Tahquamenon Falls St. Park	Tahquamenon Natural Area	PLD 6-NRC
PRB	Thompson's Harbor St. Park	Thompson's Harbor Natural Area	LD TNC
PRB	Wagner Falls Scenic Site	Wagner Falls Scenic Site (Natural Area)	LD
PRB	Warren Dunes St. Park	Grand Mere	NNL AR
PRB	Warren Dunes St. Park	Warren Dunes Nature Study Area (Natural Area)	LD
PRB	Warren Dunes St. Park	Warren Woods Nature Study Area (Natural Area)	LD NNL
PRB	Waterloo Recreation. Area	Black Spruce Bog Natural Area	LD NNL
PRB	Waterloo Recreation. Area	Little Cedar Lake	TNC
PRB	Wilderness St. Park	Wilderness State Park Natural Area	PLD 2-TNC 3-NRC
TWP	Riverbend Park (Twp. park, formerly state owned)/ Utica Schools (approx. 2 acres)	Shadbush Tract Nature Study Area (Natural Area)	LD
WLD	Allegan St. Game Area	Allegan Pine Plains	TNC
WLD	Allegan St. Game Area	Crooked Lake Marsh Natural Area	NLD TNC
WLD	Barry St. Game Area	Bowerman-Barry Prairie & Turner Creek Wetlands	TNC
WLD	Fish Point Wildlife Area	Sebewaing Bay Prairie Natural Area	NLD TNC

<b>Division Bureau</b>	<b>Management Unit</b>	<b>Site Name</b>	<b>Recogn- ition</b>
WLD	Gourdneck St. Game Area	Hampton Creek Wetland Complex	TNC
WLD	Gratiot-Saginaw St. Game Area	Gratiot-Saginaw St. Game Area Site	TNC
WLD	Lost Nation St. Game Area	Lost Nation State Game Area Site	TNC
WLD	Maple River St. Game Area	Maple River Salt Marshes	TNC
WLD	Petersburg St. Game Area	Minong-Petersburg Prairie	TNC
WLD	Pointe Mouille St. Game Area	Pointe Mouille	TNC
WLD	Portland St. Game Area	Portland State Game Area Site	TNC
WLD	Quanicassee State Wildlife Area	Coryeon Point (Cotter Road Prairie)	TNC
WLD	St. Clair Flats Wildlife Area	Dickinson Island/Harsen's Island Natural Area	NLD
			TNC
WLD	St. Clair Flats Wildlife Area	St. John's Wet Prairie	TNC

## APPENDIX E: BIODIVERSITY SITE MANAGEMENT

As required by the Work Instruction 1.4, Biodiversity Management on State Forest Lands, Special Conservation Areas including High Conservation Value Areas and Ecological Reference Areas must be managed for their respective biodiversity values. The following template (modeled after The Nature Conservancy's "5-S Framework") will assist natural resource managers in framing and prioritizing management of SCAs on State Forest Land.

STEP 1: Utilize the Site Conservation Planning process to:

- A. Identify & Rank Conservation Values
- B. Identify threats to each conservation value (i.e. invasive species, over browsing, over use, fragmentation etc.)
- C. Identify strategies to reduce or eliminate each threat.
- D. Rank by priority, strategies with a high potential for success, for high priority targets, and that alleviate multiple threats and where the capacity to implement exists.
- E. Develop a work plan consisting of lists of tasks that can be accomplished given current staff, alternative labor, expertise, and funding. The work plan must include any restrictions that would apply to activities such as wild fire suppression.
- F. Record using the existing inventory system (OI or IFMAP).

STEP 2: Implement the Work Plan

STEP 3: Monitor at a minimum by visiting the SCA each year, filling out a form (to be developed) and reporting to the Ecoregional and Statewide Biodiversity Planning Teams annually. The surveillance and annual site visits and may be accomplished by volunteers.

## APPENDIX F: FOREST CERTIFICATION IMPLEMENTATION TEAM (FCIT) BIODIVERSITY ASSESSMENT PLAN

This appendix summarizes ongoing and potential planning assessments identified during the development of the Biodiversity Management on State Forest Lands Work Instruction 1.4. to inform Biodiversity Conservation Planning Process (BCPP) and biodiversity management on State Forest Lands. The statewide biodiversity planning team will coordinate activities and assessments with external partners and other DNR projects.

### 1. Fine Filter Landscape Assessment

**Purpose:** Predict where Threatened (T) and Endangered (E), Special Concern (SC), Species of Greatest Conservation Need (SGCN) and exemplary natural communities are likely to occur.

This assessment brings together existing activities such as Michigan Natural Features Inventory (MNFI) Element Occurrence Database and Modeling Activities and proposed activities as part of the Wildlife Division's and MNFI's Biodiversity Atlas Project. This assessment will have some overlap with HCVA and Large Landscape Assessments below.

#### **Actions and Products:**

1. Develop a version of the Element Occurrence (EO) Database that can be used in the field.
2. Develop a probability of EO map. (This has been done for some areas already.)
3. Make existing habitat models for the above species available from GAP and from MNFI.
4. Do an "Irreplaceability Analysis" to help identify and prioritize the most critical areas to conserve for the protection of the above species and communities.

### 2. Special Conservation Area (SCA), High Conservation Value Area (HCVA), and Ecological Reference Area (ERA) Assessment

**Purpose:** Document existing Special Conservation Areas, High Conservation Value Areas and Ecological Reference Areas that have a special Department designations [crosswalk with other designations including Potential Old Growth (POG)] . Evaluate the Natural Community representation in these areas. Inform the Biodiversity Conservation Planning (BCPP) Process on the current Natural Community representation.

#### **Actions and Products:**

1. Develop an integrated GIS layer of **existing** SCAs, HCVAs and ERAs in the State. (In progress)
2. Develop a list of under represented natural community within existing SCAs, HCVAs and ERAs within eco-regions. (To be conducted by through BCPP at the ecoregional level)

### 3. Matrix Forest Landscape Assessment

**Purpose:** To identify potential Matrix Forest Biodiversity Management Areas where the primary conservation value is to minimize forest fragmentation and forest stand simplification.

This new assessment will attempt to identify large landscape forests with biodiversity values that can be maintained or enhanced. These values may include: large contiguous forest areas, large areas of unfragmented cover types, unique mosaics of natural communities, and core forest areas with corridors connecting to other core areas.

In addition, this assessment will attempt to identify sites containing natural communities simplified compositionally and or structurally through past management yet are good candidates for restoration. Guidelines for restoration of stand diversity in this context may be developed. Some existing projects in the DNR that address restoration of stand diversity include the Interim Guidelines for Mesic Conifers in the West UP (a process for implementing Mesic conifer restoration), the Red Pine Project and the Landowner Incentive Program.

These assessments should be coordinated with the Biodiversity Atlas Project and The Nature Conservancy's Northern Forest Initiative.

**Actions and Products:**

1. Develop Matrix Forest biodiversity value maps based upon the following characteristics:
  - A. Areas of large unfragmented forest
  - B. Core forest areas and their corridors
  - C. Areas of relatively intact natural communities
  - D. Unique landscape mosaics (drumlin fields, patterned peatlands)
  - E. Areas with opportunities for natural community restoration.
    - a. Develop guidelines for restoration of stand diversity.
    - b. Large roadless areas
2. Identify potential Areas on DNR forest lands where High Quality Natural Communities maybe found. Analysis will be informed by fine filter landscape and HCVA assessments. This analysis will inform the BCPP process.
3. Update the HCVA GIS data layer with products from this assessment.

**4. Species of Greatest Conservation Need (SGCN) analysis of Habitat and Threats on DNR Managed Lands**

**Purpose:** To identify threats to species of greatest conservation need that the DNR can help mitigate through State Forest land management.

Use the information contained in the Wildlife Conservation Strategy and the Michigan Gap Analysis Project to 1) identify where select SGCN are likely to occur on State Forest land and 2) identify threats that can be mitigated through our land management activities.

**Actions and Products:**

1. Identify species with adequate information on life history and distribution from the intersection of SGCN species list and GAP Species list. Start with terrestrial vertebrates.
2. Identify through the use of GAP Models and known occurrence records where these species occur on DNR lands.
3. Identify threats to these species that may be mitigated through changes in our land management practices.
4. Develop a set of management guidelines for these species on DNR lands when guidelines do not already exist.

**5. Assessment of Aquatic Ecosystem Representation**

**Purpose:** To identify high quality aquatic ecosystems in the state and specifically on or within DNR Forest Lands and to assess protection and management..

Fisheries Division Research and Planning staff have initiated queries applying buffers along existing stream valley segment data and land use data.

**Actions and Products:**

1. Identify high quality stream valley segments and lakes using GIS analyses.
2. Cross reference with MNFI data base, river assessments and other available data.
3. Develop a potential suite of aquatic ecological reference areas (A-ERA).
4. Identify threats to the potential A-ERAs that may be mitigated through changes in our land management practices.
5. Develop a set of protection and management guidelines for these ERA's